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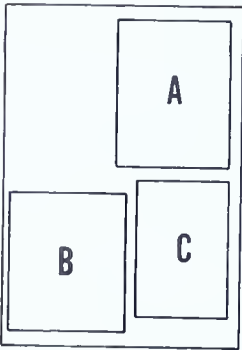
OUTSTANDING SCENIC GEOLOGICAL FEATURES OF PENNSYLVANIA

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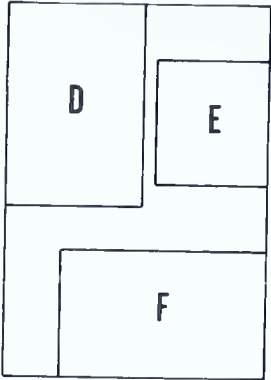
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- D Pinchot Falls (Pike County)
- E Dinosaur Rock (Lebanon County)
- F Penns View (Centre County)

BACK COVER



On title page: Falls in Ricketts Glen State Park, Luzerne County

OUTSTANDING SCENIC GEOLOGICAL FEATURES OF PENNSYLVANIA



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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF
TOPOGRAPHIC AND GEOLOGIC SURVEY
Arthur A. Socolow, State Geologist

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PREFACE

Scenery has been recognized as a natural resource in the United States since 1864, when the first state park, Yosemite Valley in California, was established. This early recognition related the scenery to outstanding geologic features of the region. Today, society recognizes these geologic features as a valuable environmental resource.

A fascinating geologic story lies behind Pennsylvania's scenery, yet you do not need to be a geologist to appreciate and enjoy the scenic features. Each of the features discussed here, however, represents an area of geologic significance in the Commonwealth where an acquaintance with certain geologic principles can enhance your appreciation of the site. Perhaps even more rewarding will be the experience of approaching these features with some knowledge of their origin.

Since geology and scenery are inseparable, it falls upon the geologist to be the interpreter of the landscape. Because of their outstanding geologic significance, the geologic features described here become outdoor classrooms, places where you can study the earth's surface in an almost natural condition, relatively undisturbed by human activities. Again, keep in mind, it is not necessary to be a geologist to appreciate scenic geological features. Each one should think of these areas as places where one can become acquainted with the processes and products of geologic change; where one can learn to appreciate fully the great age of the earth, its fascinating history, and the complexity of geologic structures and rock composition.

ARTHUR A. SOCOLOW



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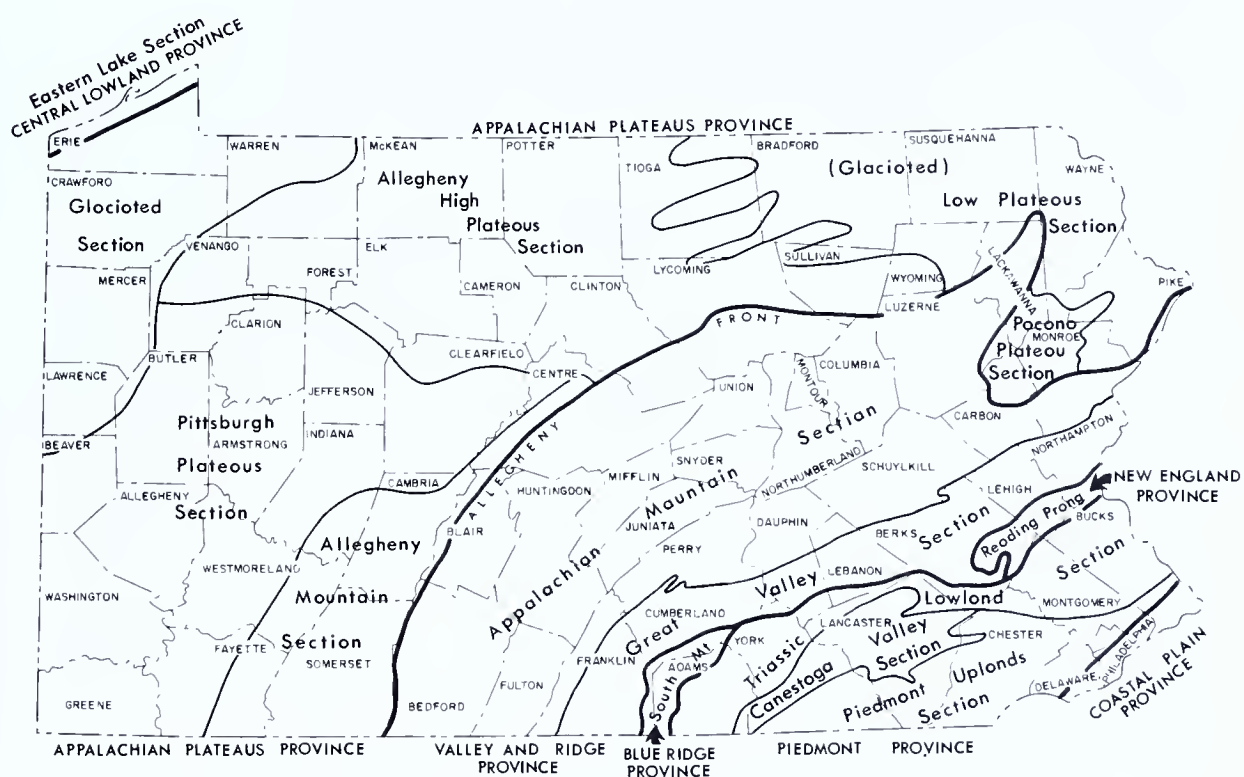
OUTSTANDING SCENIC GEOLOGICAL FEATURES OF PENNSYLVANIA

by
Alan R. Geyer and William H. Bolles

INTRODUCTION

PRESENTATION

Pennsylvania's outstanding geologic and scenic features have been listed by physiographic province. Every province (or section of a province) has its own characteristic landscape and a related distinctive geologic character that is unique to that province; the sum of all the outstanding scenic geological features listed within the province provides an in-depth view of those characteristics. Photographs and sketches are used to illustrate the geologic character of the province, as well as the interrelationship of the landscape with the geology.



PHYSIOGRAPHIC PROVINCES OF PENNSYLVANIA

Each feature is located by a written description and a specific location on a 7-1/2-minute topographic map as published by the U. S. Geological Survey. The topographic map insert is a small portion of the actual sheet, but will contain identifiers that should enable the viewer to locate himself on the corresponding entire map. Most of the map inserts are printed at scale 1:24,000 (1 inch = 2000 feet); those that are not printed at that scale contain a small rake scale in the lower part of the map. Many of the geologic sites described may be found by using a common highway map of Pennsylvania. Others, however, may require the aid of the appropriate 7-1/2-minute topographic map. Some of the sites are accessible by car, whereas others may require considerable hiking. This should be determined by carefully reading the topographic map to see what type of road or trail, if any, reaches the area.

The scenic geological features inventoried herein are not intended to be all-inclusive. This presentation includes those that, in the opinion of the authors and others, are outstanding. Every effort was made to be as thorough as possible; however, some outstanding sites may have been missed. Future editions will include those that were overlooked in this volume.

Many minor waterfalls, springs, and mineral and fossil occurrences have been omitted because they did not meet the stated criteria of this presentation. These minor features are listed and described in other publications (see Selected Bibliography). In addition, caves have been omitted. It is recognized that all caves are outstanding geological features and indescribably scenic, but a series of Pennsylvania Geological Survey publications (see Selected Bibliography) contains identifications and descriptions of Pennsylvania caves in greater detail than is possible here.

A glossary of geologic terms has been provided. To better define many of the terms, a small sketch illustrating the definition is included. To facilitate the finding of any individual scenic geological feature, an index is provided. The index is cross referenced by county (in the table of contents), and alphabetically by subject and by physiographic province (in the back of the book).

METHOD OF STUDY

The search for outstanding scenic geological features of Pennsylvania began with a survey of all county and regional planning commissions; they were asked to identify such areas in their community. In addition, a search was made of all publications on Pennsylvania geology, and each of the 764 quadrangle maps (7-1/2-minute series) was studied. Every location that was identified as a possible scenic geological feature was field checked to determine its validity based upon the following criteria:

INTRODUCTION

1. The site must lend itself to the interpretation or illustration of the geologic heritage of Pennsylvania; i.e., it must be one or more of the following:
 - A. A natural feature illustrating geologic processes or geologic formations.
 - B. A site having fossil evidence of the development of life throughout geologic time.
 - C. A location that illustrates scientific discoveries.
 - D. A scenic location characteristic of a physiographic province.
2. The scenic geological feature is of national, state, or local significance.
3. When considered together, the features illustrate the diversity of Pennsylvania's geologic environment.

RELATIONSHIP TO PLANNING

Outstanding Scenic Geological Features of Pennsylvania provides technical background information for land use planning efforts at all levels of government. Local governments can incorporate the information in their comprehensive plans, zoning ordinances, and subdivision regulations. The information can also be useful for identifying such important geologic and scenic features in national forests, state forests, state parks, state game lands, and other government-owned lands in Pennsylvania. In addition, many state planning programs, including the Environmental Master Plan, State Recreation Plan, and Governor's Office of State Planning and Development Land Policy Program, have recognized the importance of protecting valuable biologic, geologic, and scenic features. This publication provides an important segment of the base-line information needed for these planning efforts. Therefore, federal, state, and local governments are encouraged to consider the information in this publication when making decisions affecting land use plans and patterns.

RELATIONSHIP TO EDUCATION

This report provides a much needed resource for the schools if they are to utilize all aspects of the community in the planning of new school programs as they relate to the Department of Education's *Project 81: A Program to Better Prepare Pennsylvania's Young People for Adulthood*. The rationale stated in that draft document specifies as one of the key elements: "... the development of new ways to use community resources in conjunction with those of the school to help students achieve those competencies." The other of the two key elements of Project 81 is the development of minimal competencies that young people need to succeed in life.

OUTSTANDING SCENIC GEOLOGICAL FEATURES OF PENNSYLVANIA

An understanding of the earth upon which we live and an awareness of the geologic processes that have resulted in our natural environment is certainly basic knowledge necessary to succeed in life. Most teachers of Earth Science are aware that “outdoor geological laboratories” provide the best means of learning how geologic processes have operated throughout the past and are taking place today. Even though aware of this, they usually are not able to find many of the best locations to illustrate these processes. To locate such areas would require a more exhaustive search of the technical literature than time would permit. This book provides, in a single publication, a comprehensive account of geologic sites and characteristics peculiar to Pennsylvania and does so by physiographic province.

No matter what the location of the school, teachers will be able to find nearby sites that are characteristic of the geology and the physiographic province in which they live. The utilization of these natural areas is certainly basic to the school’s use of community resources.

When properly used, the natural resources of a community provide the fundamental framework upon which lifelong learning may take place with regard to our environment. The geologic characteristics, principles, and processes that are illustrated in Pennsylvania also carry over to similar locations throughout the world.

Although the book deals primarily with the geologic significance of the selected sites, the sites may also be utilized in many other disciplines, such as biology, social studies, environmental education, art, and mathematics. Recreation and hobbies many times result in a lifelong learning experience for students and adults.

RELATIONSHIP TO NATIONAL NATURAL LANDMARK PROGRAM AND RELATED FEDERAL PROGRAMS

A national policy of preserving outstanding examples of our country’s natural and historical resources for the benefit and enjoyment of the people is implemented by two major federal programs of the U. S. Department of the Interior: 1) administration of areas of the National Park System, and 2) identification and registration of National Landmarks (natural, historical, environmental, educational, etc.) to encourage preservation of nationally significant properties regardless of ownership.

Under the Natural Landmarks Program, the Heritage Conservation and Recreation Service (HCRS) strives to assure the preservation of such a variety of significant areas that, when considered together, they will illustrate the natural environment of the United States.

INTRODUCTION

A natural landmark may represent a single theme that best characterizes it, but it also may represent other themes. The themes represent two major categories of natural phenomena; one is geological, the other ecological. The compilation presented herein will deal only with those that are geological.

As the HCRS evaluates sites for theme and outstanding characteristics, it is also gradually completing an inventory of the country's natural areas. The same is true for Pennsylvania in this presentation. Both studies focus attention on specific areas, and this attention may stimulate wise land use of these significant areas.

The Environmental Education Landmarks Program, started in 1968, is the most recent part of the National Landmarks Program. These landmarks are designated for use by schools and the general public for teaching the principles of environmental awareness. Many of the sites discussed in this book would fit this program.

The National Wild and Scenic Rivers System created by Congress in 1968 is another federal program dedicated to the conservation of our remaining wild and free-flowing rivers or portions of them. The federal government also encourages state and local governments to participate in this program. The state legislature also passed the Pennsylvania Scenic Rivers Act in 1972 to protect state wild, scenic, and recreational rivers.

The National Wild and Scenic Rivers System now includes the upper and middle portions of the Delaware River. The federal government is currently studying the Upper Allegheny River, Youghiogheny River, and Pine Creek for possible inclusion in the system. In addition, the state legislature has designated the Schuylkill River from the Schuylkill-Berks County line to Fairmount Dam as the first component of the Pennsylvania Scenic Rivers System. The Pennsylvania Scenic Rivers Program has identified additional rivers which will be studied for inclusion in the state system. Some of the sites included herein are along these rivers.

SELECTED BIBLIOGRAPHY

- Flippo, H. N., Jr. (1974), *Springs of Pennsylvania*, Department of Environmental Resources, Office of Resources Management, Water Resources Bulletin 10, 46 p.
- Geyer, A. R., Smith, R. C., II, and Barnes, J. H. (1976), *Mineral collecting in Pennsylvania*, 4th ed., Pennsylvania Geological Survey, 4th ser., General Geology Report 33, 260 p.
- Gordon, S. G. (1922), *The mineralogy of Pennsylvania*; reprinted 1973 by Friends of Mineralogy, Region 3, Box 19, Blue Ball, Pennsylvania, 255 p.

OUTSTANDING SCENIC GEOLOGICAL FEATURES OF PENNSYLVANIA

- Hoskins, D. M. (1969), *Fossil collecting in Pennsylvania*, Pennsylvania Geological Survey, 4th ser., General Geology Report 40, 2nd printing, revised, 126 p.
- Montgomery, Arthur (1969), *The mineralogy of Pennsylvania, 1922-1965*, Academy of Natural Sciences of Philadelphia, Special Publication 9, 104 p.
- Reed, J. C. (1976), *Annotated bibliography of minerals new to the Pennsylvania list, 1965-1974*, The Mineralogical Society of Pennsylvania, Inc., 83 p.
- Reich, J. R., Jr., compiler (1974), *Caves of southeastern Pennsylvania*, Pennsylvania Geological Survey, 4th ser., General Geology Report 65, 120 p.
- Smith, R. C., II (1978), *The mineralogy of Pennsylvania, 1966-1975*, Friends of Mineralogy, Pennsylvania Chapter, Inc., Special Publication No. 1, 304 p.
- Stone, R. W. (1942), *Many waterfalls in Pennsylvania*, Pennsylvania Department of Internal Affairs Bulletin 10, no. 12, p. 21-30.
- White, W. B., editor (1976), *Caves of western Pennsylvania*, Pennsylvania Geological Survey, 4th ser., General Geology Report 67, 97 p.
- _____ (in preparation), *Caves of the Valley and Ridge province, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., General Geology Report 68.
- _____ (in preparation), *Caves of the Great Valley, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., General Geology Report 69.

SCENIC GEOLOGICAL FEATURES BY PHYSIOGRAPHIC PROVINCE AND SECTION

Where to go and what to see—geologically and scenically—is the theme of this section. Pennsylvania's major highways and secondary roads offer convenient access to most of the outstanding scenic geological features described. Many state parks, state forest natural areas, and state or national forest picnic areas are oriented around outstanding and often unique rock formations or spectacular scenery. In addition, many local parks preserve interesting geologic features.

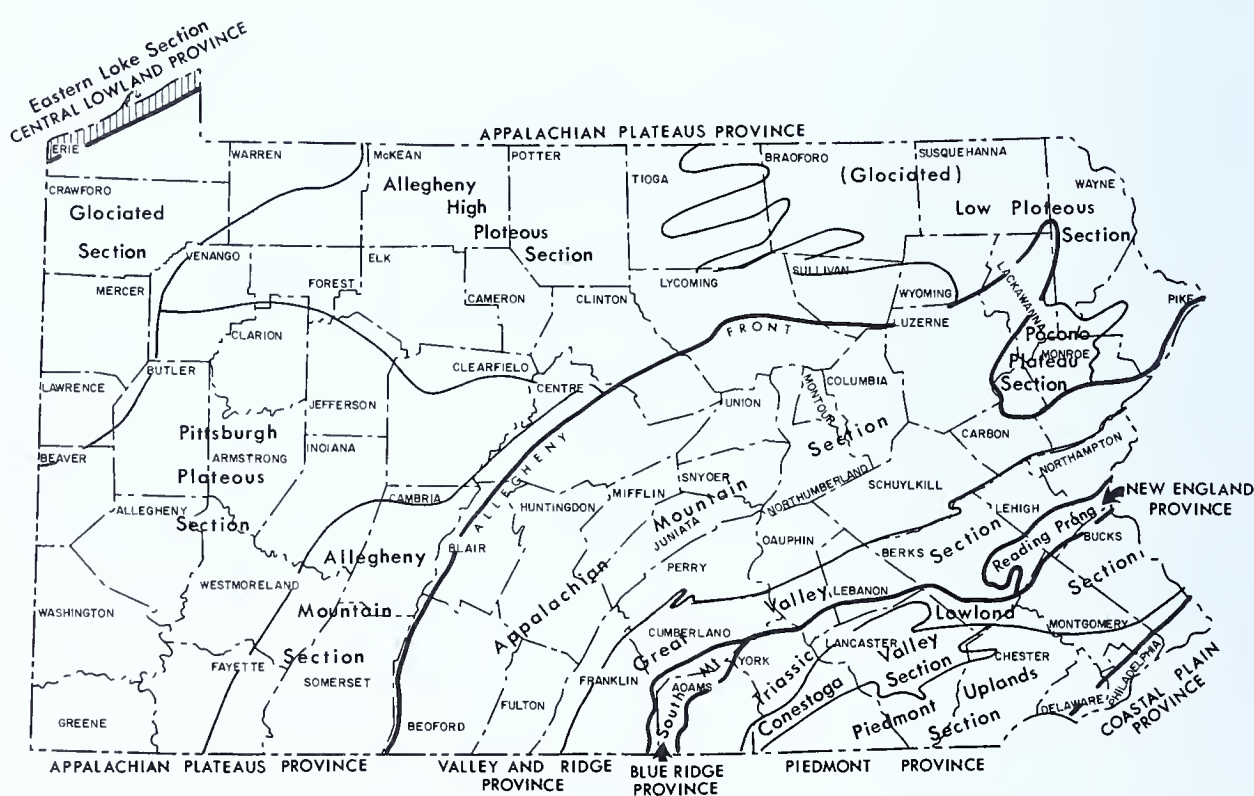
Geologically outstanding features and areas inventoried in this booklet are those that have a distinctive quality and are of local, state, or national significance. Considered as a group, they illustrate the diversity and grandeur of Pennsylvania's scenery and geology. Although emphasis is placed on the geology of each feature, additional information is provided.

Please note that the listing of a site does not constitute permission to enter a property or, in the case of publicly owned land, to carry away any natural specimen. Always ask permission from the owners of the land before entering. NEVER TRESPASS.

CENTRAL LOWLAND PROVINCE — EASTERN LAKE SECTION

TOPOGRAPHY

Low elevations and relief are characteristic. This section has been called the *lake plain*. The lake plain bordering Lake Erie extends landward for a distance of 2 miles in the eastern portion and 5 miles in the western part. Elevations start slightly above the lake level of 572 feet and rise to approximately 800 feet above sea level. The surface of the lake plain is extremely flat except for abrupt rises to former beaches created by higher levels of the lake in the past. Streams flow across the lake plain on bedrock in steep-walled valleys cut into glacial or lake deposits.



GEOLOGY

Although bedrock underlies all of the region, it is concealed by a thick cover of unconsolidated glacial deposits. The best exposures occur along the Lake Erie shore and along the walls of deep-cut creeks flowing down across the escarpment and the lake plain.

CENTRAL LOWLAND PROVINCE

EASTERN LAKE SECTION



The thickness of the deposits over most of the lake plain varies between 10 and 75 feet. Deposits are more than 100 feet thick along the course of a buried valley that runs between Albion and Springfield Station.

The following rock units are present:

SYSTEM	ROCK UNIT	DESCRIPTION
Quaternary	Glacial deposits	Sands and gravels.
Upper Devonian	Chadakoin Formation	Alternating shales and sandstones, fine-grained, gray, fossiliferous.
	Girard Shale	Ashen-gray shale; uniform texture.
	Northeast Shale	Gray shale and sandstone, thin bedded, fine-grained.

The waters of early lakes in the Erie Basin worked upon the preexisting sediments, most of which were tills, and upon the rock where it was exposed. This produced along the southern shore of present Lake Erie a 2.5- to 4-mile-wide plain, on the surface of which are blanket deposits of sands, silts, and clays; a series of beach ridges were formed at different elevations.

1. PRESQUE ISLE

COUNTY: Erie

TOWNSHIP: Millcreek

QUADRANGLE: Erie North

LOCATION: Presque Isle State Park; along the southern shore of Lake Erie.

REMARKS: Presque Isle is a relatively recent geologic feature of glacial origin, having developed less than 13,000 years ago, after the final retreat of glacial ice from northwestern Pennsylvania. The peninsula, approximately 6 miles long, is composed of sand deposits brought into the area from the west by lake currents.

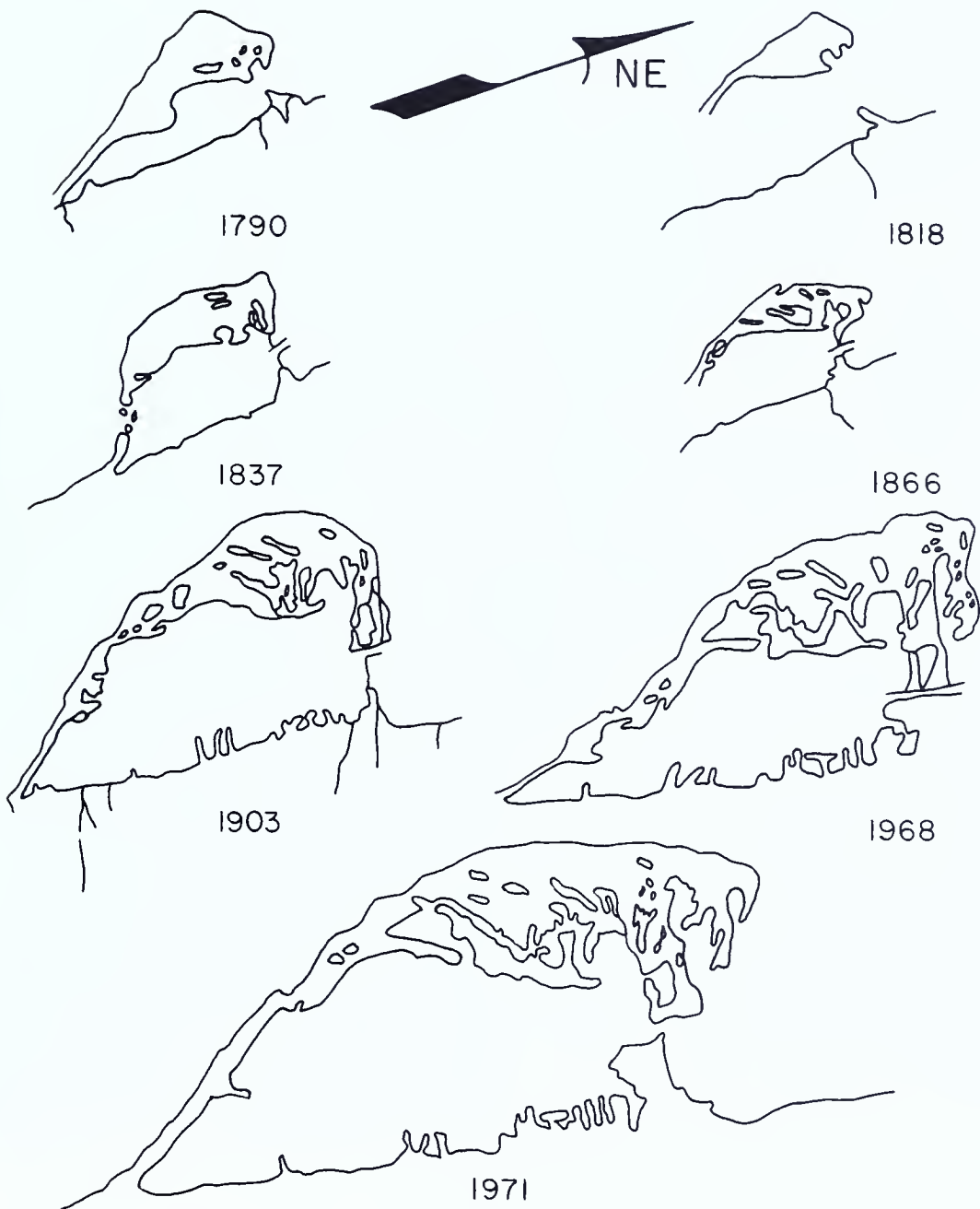


CENTRAL LOWLAND PROVINCE

EASTERN LAKE SECTION



Within record, except for diminishments in the periods 1790-1818 and 1837-1866, Presque Isle has grown so that presently the neck is about three times longer, the exposed land area three to four times greater, and the overall reach of the feature nearly three times greater than in 1790. Over the years there has been a movement and growth of the



THE DEVELOPMENT OF PRESQUE ISLE SINCE 1790

(from U. S. Army Corps of Engineers, 1973)

PRESQUE ISLE *(continued)*



(Photograph by Grant Heilman)

CENTRAL LOWLAND PROVINCE

EASTERN LAKE SECTION



entire peninsula in a northeasterly direction, the direction of the lake current, and recession of the lakeside beaches at the southwest end.

The northeastward growth of Presque Isle created small ponds of water of various ages. This situation provides a unique opportunity for the scientific study of the plant and animal life in and around these ponds. Therefore, in addition to being a scenic geological feature, the biological environment of Presque Isle is of considerable scientific importance.

The site is also of historical importance because it is associated with Perry's great victory of the Battle of Lake Erie in the War of 1812. It is a registered National Natural Landmark.

REFERENCES:

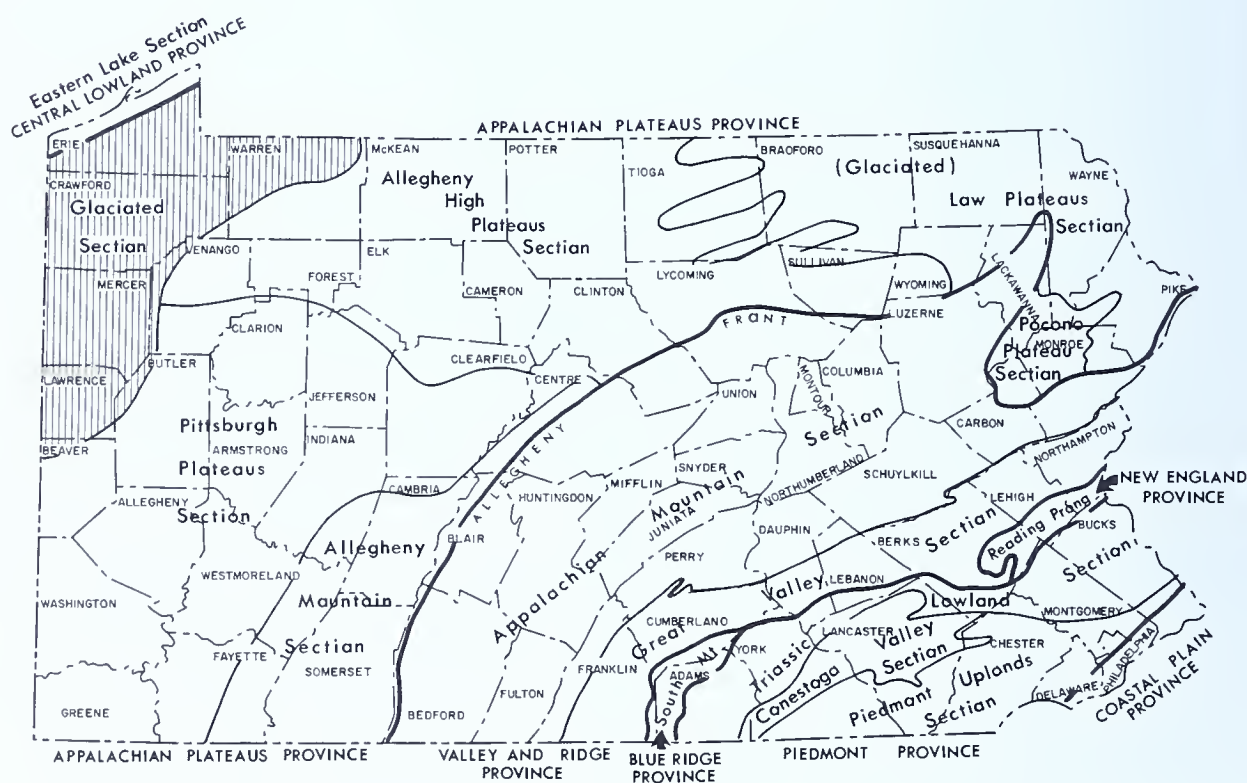
- Hough, J. L. (1958), *Geology of the Great Lakes*, University of Illinois Press, Urbana, Illinois, 313 p.
- Tomikel, J. C., and Shepps, V. C. (1967), *The geography and geology of Erie County*, Pennsylvania Geological Survey, 4th ser., Information Circular 56, 64 p.
- U.S. Army Corps of Engineers (1973), *Revised draft, Environmental Impact Statement on the Cooperative Beach Erosion Project at Presque Isle, Pennsylvania (Erie, Pennsylvania)*, Buffalo District, p. 45.

APPALACHIAN PLATEAUS PROVINCE— GLACIATED SECTION

TOPOGRAPHY

The glacial deposits lie north of a line from Ellwood City in Beaver County to near the center of the northern boundary of Butler County. The land surface vividly shows such features of glaciation as terminal moraines, kettle lakes, swamps, eskers, drumlins, and kame terraces. Local relief is greatly subdued.

Dendritic drainage patterns are characteristically developed on the nearly horizontal beds of rock. However, due to modification from glaciation, crude radial and trellis patterns can be locally found.



GLACIAL DEPOSITS

Northwestern Pennsylvania is covered with deposits of drift carried by the continental ice sheets. Tills of the various ice advances are identified and separated on the basis of leaching, texture, color, and soil-profile de-

APPALACHIAN PLATEAUS PROVINCE

GLACIATED SECTION



velopment and are treated as rock units. A table of the ice advances, geologic units, and composition follows:

	NAME OF ADVANCE	GEOLOGIC UNIT	TYPE OF SEDIMENT
Wisconsinan	Ashtabula	End moraine	Silt-rich till
	Hiram	End moraine	Clay-rich till
		Ground moraine	Clay-rich till
	Lavery	End moraine	Silt-rich till
		Ground moraine	Silt-rich till
	Kent	End moraine	Till
Illinoian		Recessional moraine	Till
		Ground moraine	Till
	Undifferentiated units	Kames, outwash, and lake deposits	Sand, gravel, and till
		Ground moraine	

ROCK COLUMN

The bedrock in the Glaciated section does not have a uniform character. The reason for this diversity in rock characteristics is that in the past the area was a coastal plain complete with deltas, sandbars, lagoons, stream channels, marginal swamps, and other coastal features. Because of the lack of a uniform depositional environment over the whole area, the rock types are the result of local conditions at a given time. No one rock unit is consistent throughout the whole area, and each specific locality has its own individuality.

A detailed description of the rock units is presented below:

SYSTEM	ROCK UNIT	DESCRIPTION
Quaternary	Alluvium	Sand and gravel deposited in and along streams.
	Glacial	Gravel varying in the amount of clay and sand and in pebble size.
Pennsylvanian	Conemaugh Group	Mostly shale and sandstone and some limestone; sandstone can be massive; lesser coal beds; Mahoning sandstone usually occurs at base.
	Allegheny Group	Alternating shale and sandstone, also contains limestone, clay, and major coal beds; Vanport Limestone is used as a marker bed.
	Pottsville Group	Sandstone occurring as thick units such as the Homewood and Connoquenessing sandstones; some coal; shale, clay, and limestone.

OUTSTANDING SCENIC GEOLOGICAL FEATURES OF PENNSYLVANIA

SYSTEM	ROCK UNIT	DESCRIPTION
Mississippian	Shenango Formation	Three sandstone intervals separated by shale interbedded with thin siltstone and sandstone.
	Cuyahoga Group	Interbedded sandstone, siltstone, and shale.
	Meadville Shale	Shale and some beds of siltstone.
	Sharpsville Sandstone	Sandstone, shale, and siltstone.
	Orangeville Shale	Soft gray shale containing scattered sandstone and siltstone beds.
	Corry and Berea Formations	Crossbedded sandstone, light colored, fine-grained.
	Bedford Shale	Shale; some siltstone.
Upper Devonian	Cussewago Sandstone	Sandstone, fine- to very fine grained; interbeds of siltstone and shale.
	Riceville and Oswayo Formations	Shale and siltstone.
	Venango Formation	Red, gray, and brown shale and sandstone; includes Venango sands and Salamanca sandstone and conglomerate.
	Chadakoin Formation	Alternating shales and sandstones, fine-grained, gray, fossiliferous.
	Girard Shale	Ashen-gray shale; uniform texture.

ROCK STRUCTURE

The rocks form broad shallow synclines and anticlines that trend in a northeast-southwest direction for hundreds of miles. This broad, wavy folding cannot be seen from any point on the ground, but must be looked at on a regional basis. The scale is in miles, not feet or inches. Within the broad structures are minor folds that also can be traced for miles. Geologic and structural maps show these folds.

APPALACHIAN PLATEAUS PROVINCE

GLACIATED SECTION



2. CONNEAUT LAKE

COUNTY: Crawford

TOWNSHIP: Sadsbury

QUADRANGLES: Conneaut Lake and Harmonsburg

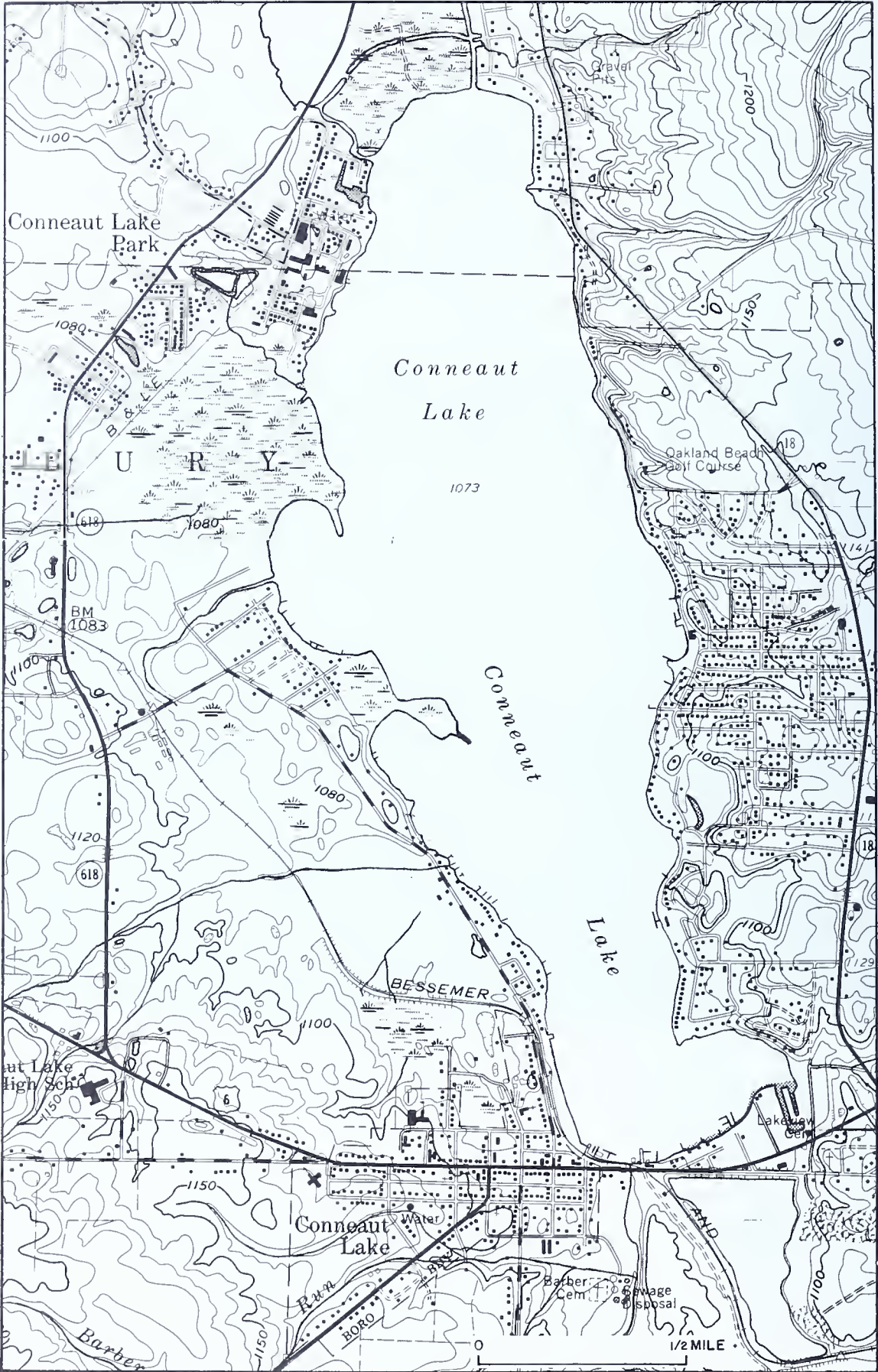


LOCATION: Immediately north of the Borough of Conneaut Lake and U. S. Route 322.

REMARKS: Pennsylvania's largest natural lake; 938 acres.

OUTSTANDING SCENIC GEOLOGICAL FEATURES OF PENNSYLVANIA

2. CONNEAUT LAKE (continued)





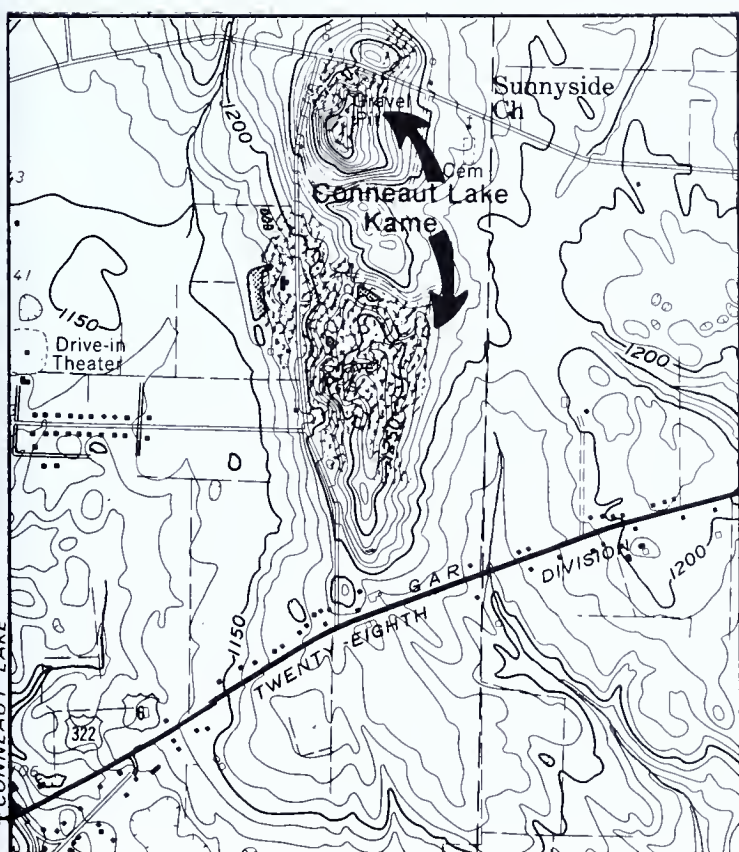
3. CONNEAUT LAKE KAME

COUNTY: Crawford

TOWNSHIP: Sadsbury

QUADRANGLE: Conneaut Lake

LOCATION: One mile east of Conneaut Lake.



REMARKS: One of the largest kames in the state; this glacial deposit marks the location of a depression filled with sand and gravel in or at the margin of stagnant ice as the glacier melted. At present a portion of the kame is being quarried for gravel.

REFERENCE: Shepps, V. C. (1962), *Pennsylvania and the Ice Age*, Pennsylvania Geological Survey, 4th ser., Educational Series 6, 33 p.

4. CONNEAUT MARSH

COUNTY: Crawford

TOWNSHIPS: Union and Greenwood

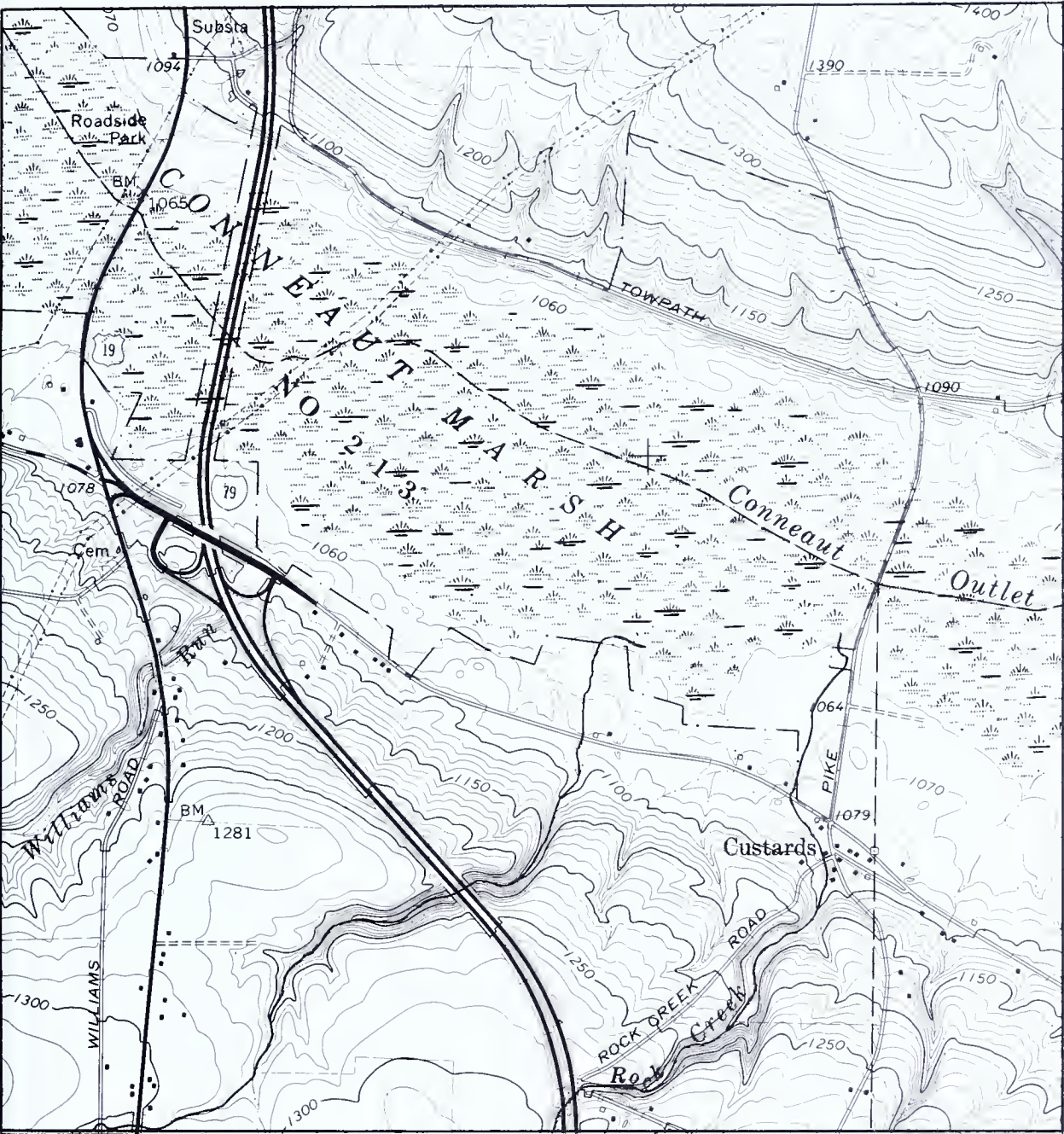
QUADRANGLE: Geneva

LOCATION: Adjacent to the Conneaut Outlet, the southern outlet to Conneaut Lake; about 4.5 miles south of Meadville; within State Game Lands No. 213.

REMARKS: One of the largest marshes in Pennsylvania, contained in an ancient stream channel that was filled with glacial till during the last glaciation in Pennsylvania. The American bald eagle nests in the marsh and the rare bog turtle has been reported. **Rock Creek Ravine** (5), at Custards in Greenwood Township, contains a series of scenic waterfalls.



APPALACHIAN PLATEAUS PROVINCE
GLACIATED SECTION



NOTES:

6. DEAD-ICE TERMINAL MORaine

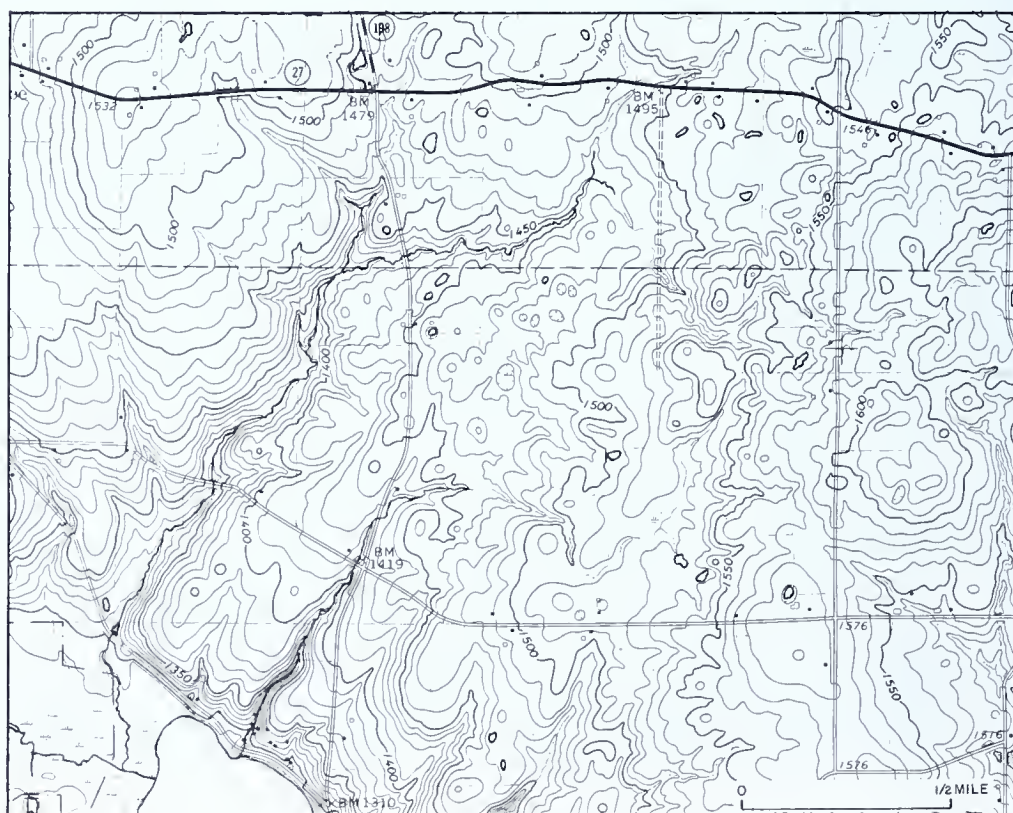
COUNTY: Crawford

TOWNSHIP: Wayne

QUADRANGLE: Sugar Lake

LOCATION: Southeastern corner of the county, immediately northwest of the Crawford-Venango County line; the moraine parallels the county line in a northeast-southwest direction.

REMARKS: The most outstanding topographic example of a terminal moraine in western Pennsylvania. This moraine marks a "dead" or stagnant position of the ice front during the Great Ice Age in Pennsylvania. The topography on the moraine is particularly hummocky due to the presence of unsorted rock materials that were pushed or carried there by the glacier.



APPALACHIAN PLATEAUS PROVINCE

GLACIATED SECTION



7. DEVILS BACKBONE

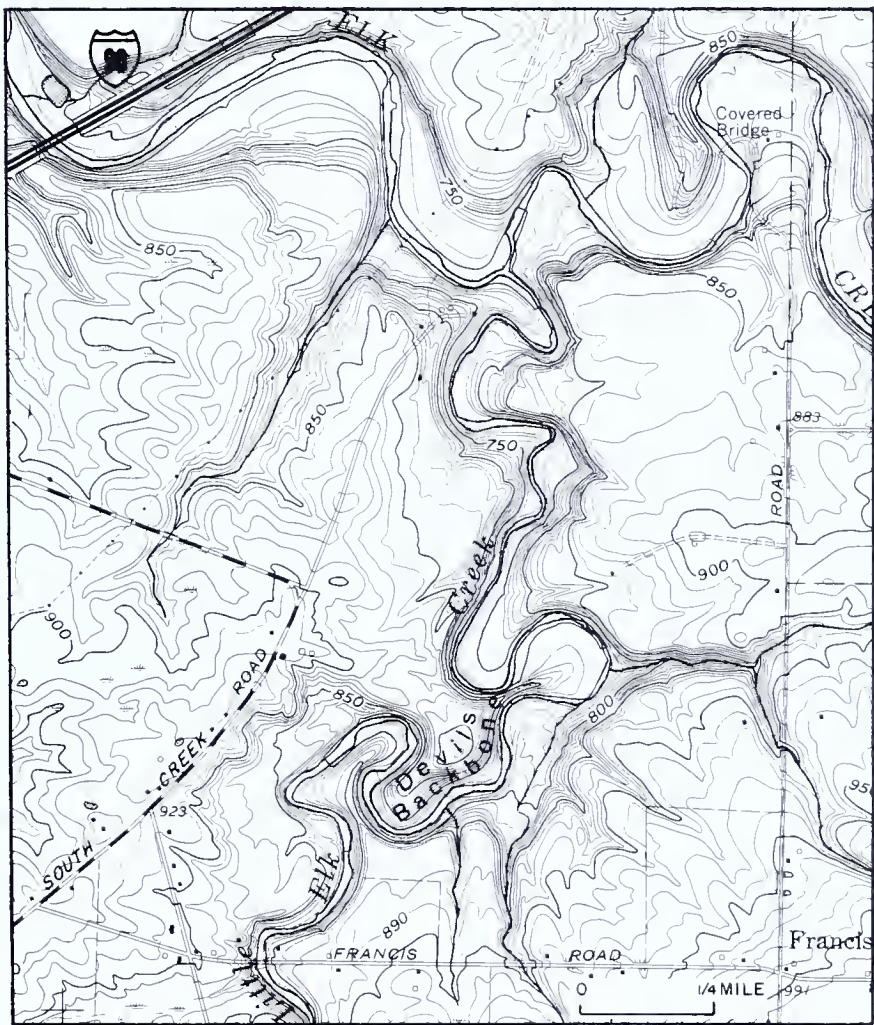
COUNTY: Erie

TOWNSHIP: Girard

QUADRANGLE: Albion

LOCATION: About 3.2 miles southeast of Girard along Little Elk Creek.

REMARKS: The shape of the land within a series of meanders in Little Elk Creek resembles a “backbone”; a unique topographic feature created by stream erosion.



8. DRUMLINS

COUNTY: Erie

TOWNSHIP: Venango

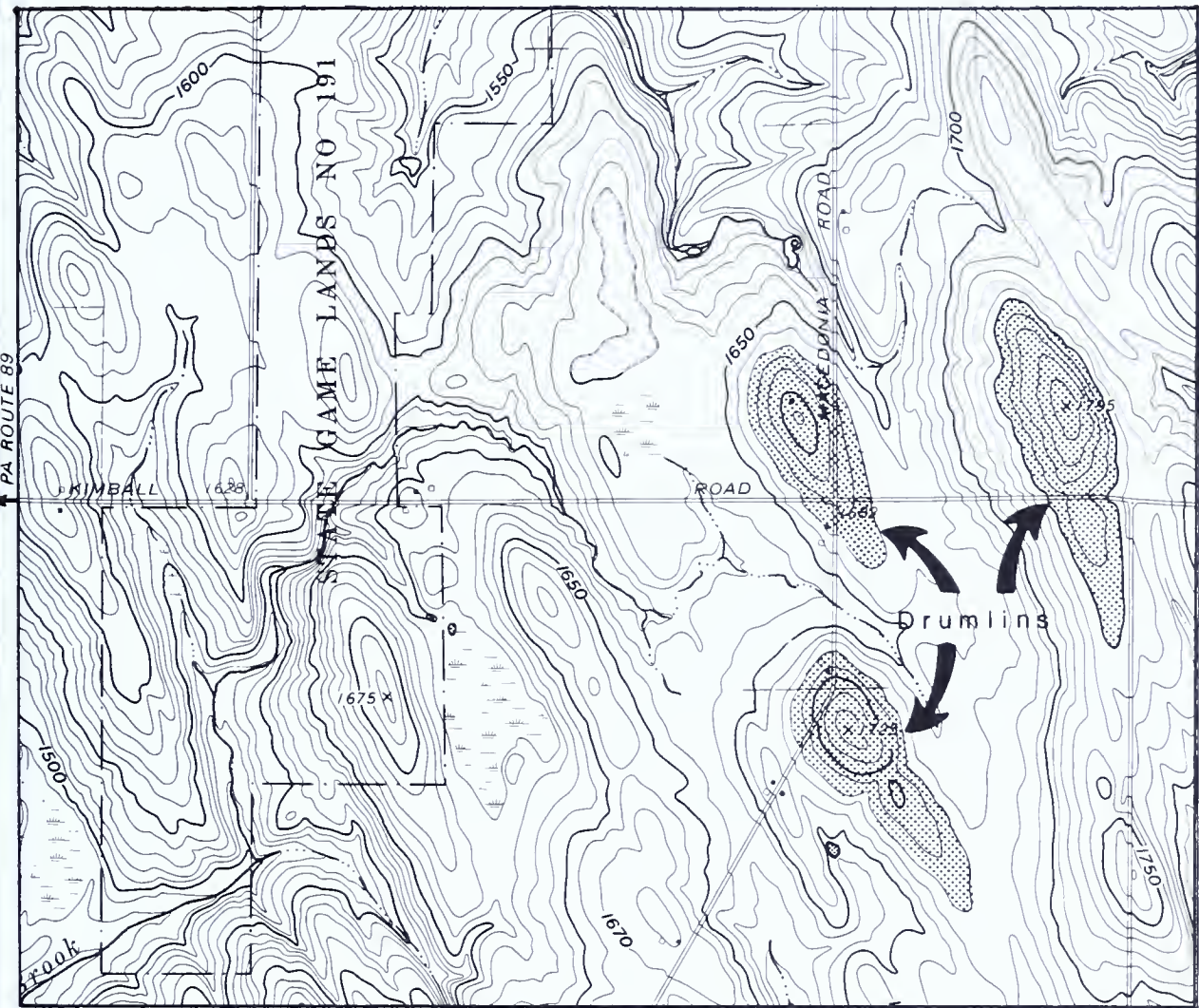
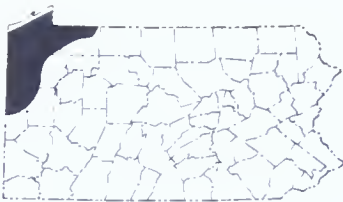
QUADRANGLE: Wattsburg

LOCATION: Two miles northeast of Wattsburg along Macedonia Road; near State Game Lands No. 191.

REMARKS: Drumlins, very common to the glaciated northwestern area of Pennsylvania, are low, smoothly rounded, elongate hills, mounds, or ridges of compact glacial till, built under the margin of the ice and shaped by its flow, or carved out of the older moraine by readvancing ice. The drumlin's longer axis is parallel to the direction of ice movement; the drumlin has a blunt nose pointing in the direction from which the ice approached, and a gentler slope tapering in the opposite direction. Drumlins at this site are almost perfect textbook examples.



APPALACHIAN PLATEAUS PROVINCE
GLACIATED SECTION



NOTES:

9. LAKE ARTHUR

COUNTY: Butler

TOWNSHIPS: Muddy Creek, Brady, Franklin, and Worth

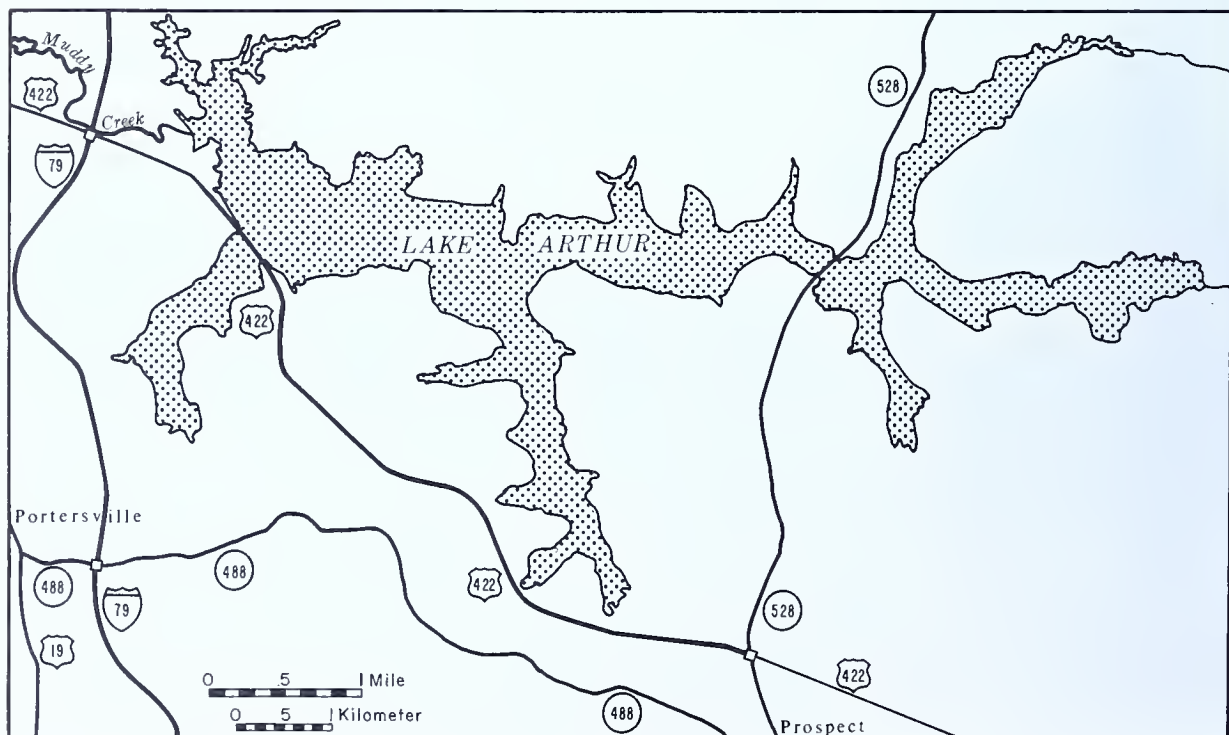
QUADRANGLE: Prospect

LOCATION: Lake Arthur, in Moraine State Park, is located 12 miles west of Butler, near the U. S. Route 422 and Interstate 79 interchange.

REMARKS: The lake occupies the site of a glacial lake that existed here over 10,000 years ago, when a continental glacier covered much of northwestern Pennsylvania. The glacial ice, whose eastern edge was at Harrisville and Slippery Rock, dammed the westward-flowing Slippery Rock and Muddy Creeks, forming lakes in their valleys; in the latter, Lake Arthur was formed.

REFERENCES: Lytle, W. S. (1959), *Field trip C, Stop 1, Glacial lake*, in Guidebook, 24th Annual Field Conference of Pennsylvania Geologists, Pennsylvania Geological Survey, p. 67-69.

_____(1970), *Moraine State Park*, Pennsylvania Geological Survey, 4th ser., Park Guide 4.





10. OIL SEEPS

COUNTY: Venango

TOWNSHIPS: Oil Creek and Cherrytree

QUADRANGLE: Titusville South

LOCATION: Along Oil Creek between Oil City and Titusville; about 2 miles east of Pa. Route 8.

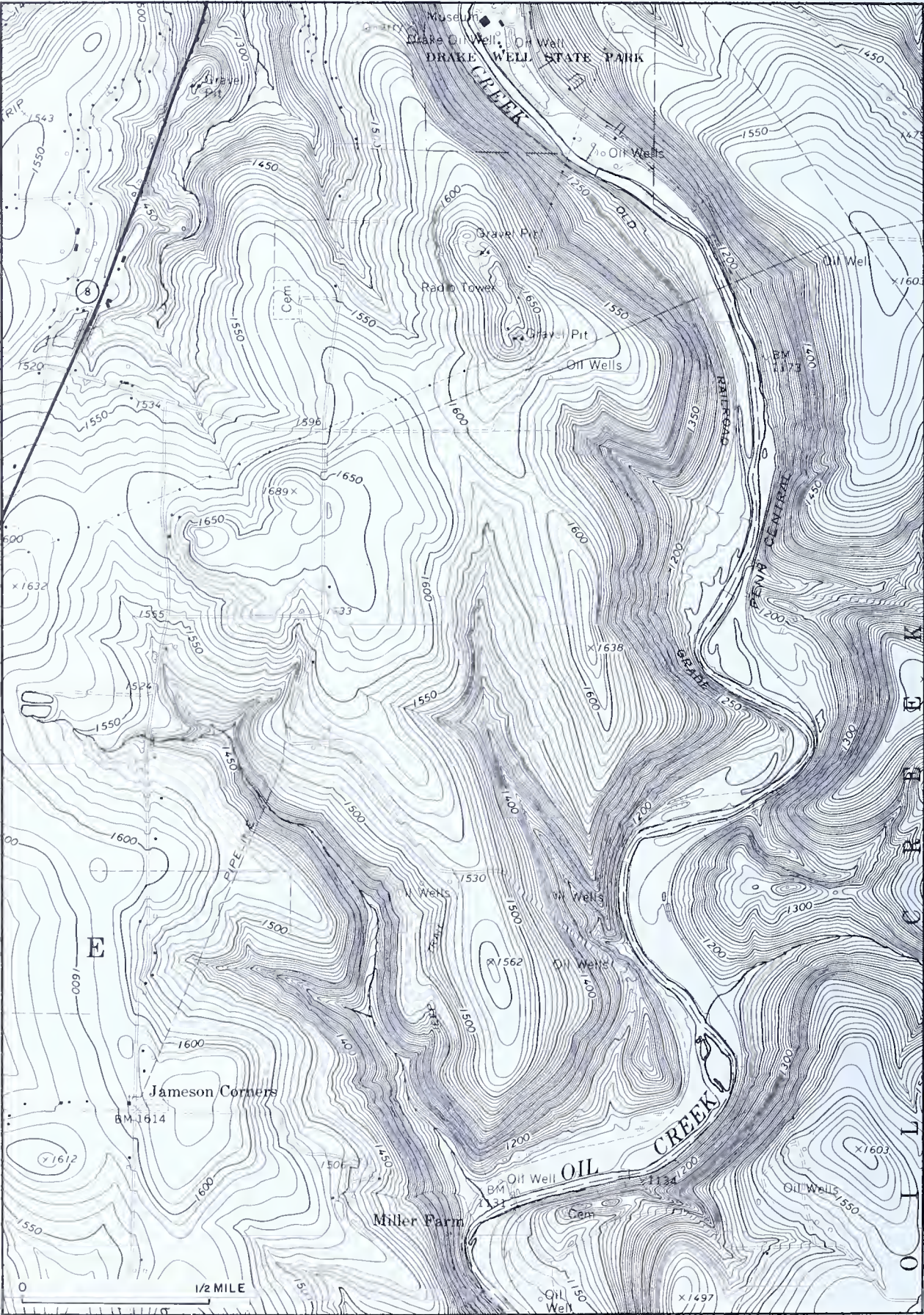
REMARKS: Oil from seeps along Oil Creek was collected by the Indians and early settlers to be used as medicine. An oil spring was first described in 1753. In 1859 the Drake Well along Oil Creek was the world's first well drilled for oil. A replica of the Drake Well may be seen at Drake Well State Park, Titusville. Large and numerous outcrops of flat-lying greenish-gray siltstones (Riceville Formation, Late Devonian age) are present near Petroleum Center.

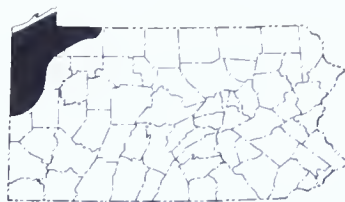
REFERENCES: Pennsylvania Bureau of Statistics, Pennsylvania Bureau of Topographic and Geologic Survey, and The Pennsylvania State University (1944), *Pennsylvania's mineral heritage*, Pennsylvania Department of Internal Affairs, Harrisburg, 248 p.

Pennsylvania Geological Survey (1959), *Field trip B, Bedrock and oil geology of northwestern Pennsylvania and the great Oildorado*, in Guidebook, 24th Annual Field Conference of Pennsylvania Geologists, Pennsylvania Geological Survey, p. 36-58.



10. OIL SEEPS (continued)





11. PIKES ROCKS

COUNTY: Warren

TOWNSHIP: Sugar Grove

QUADRANGLE: Lottsville

LOCATION: About 2.5 miles northeast of U.S. Route 6 near the village of Wrightsville.

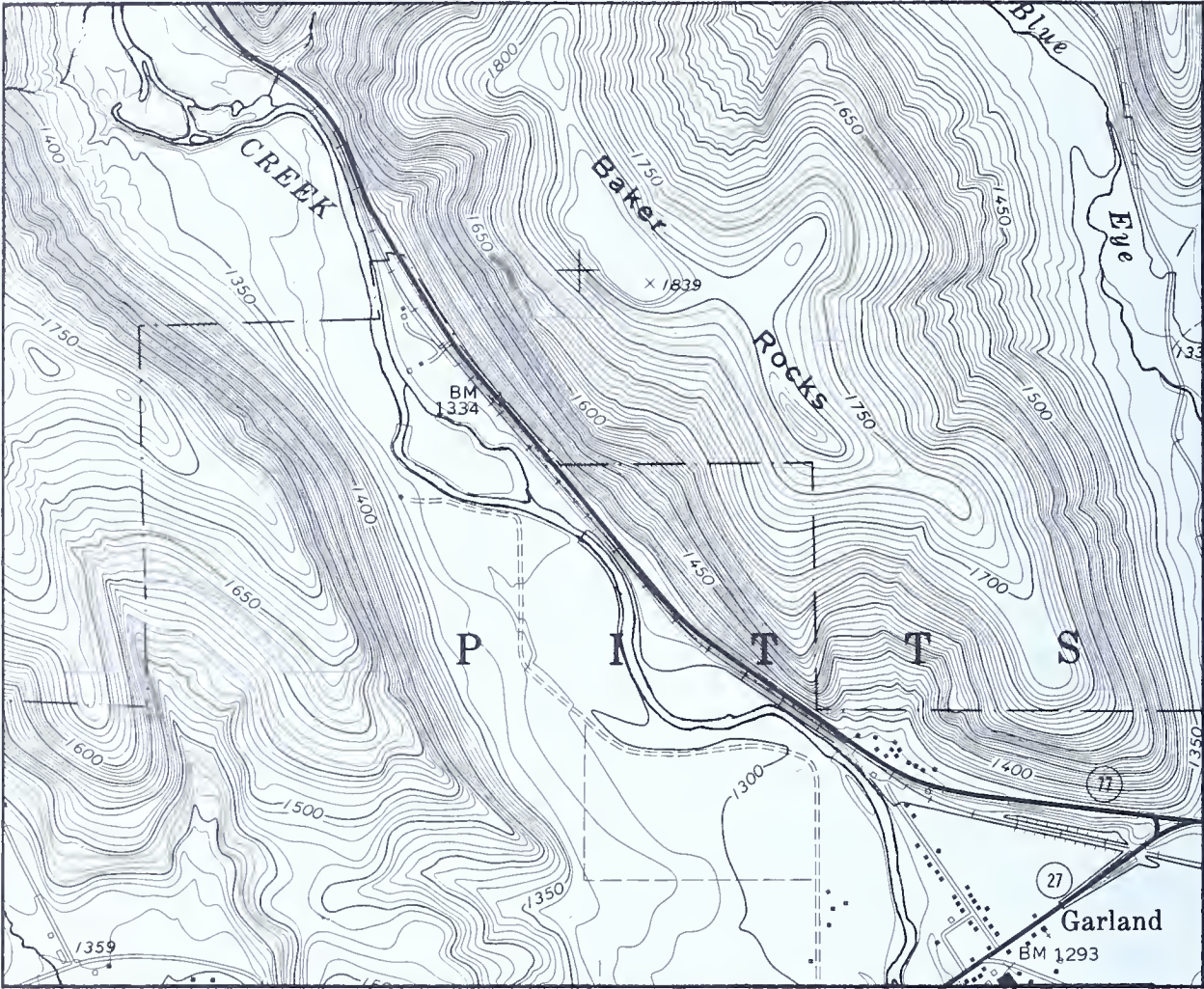
REMARKS: The site of a "rock city" on the ridge between Little Brokenstraw and Stillwater Creeks; the rocks rise to an elevation of 1980 feet above sea level. Rock walls of conglomerate rise about 30 feet in height and weather into fantastic profiles. The rock is a massive conglomerate known as the Sharon Formation (basal Pottsville Group, Pennsylvanian age) that contains layers of clear to white, coarse pebbles, some as large as chicken eggs, and has little to no sand matrix. John F. Carll in 1880 wrote about the site (p. 23 in reference below): "It presents mural exposures on all sides, and looks in the distance, whatever point of perspective may be chosen, like the ruins of some Cyclopean structure built by a pre-historic race."

Similar "rock cities," **Lottsville Rock City** (12), **Nuttles Rocks** (13), **Brooks Rocks** (14), and **Baker Rocks** (15), occur nearby, but Pikes Rocks is the largest and most spectacular.



REFERENCE: Carll, J. F. (1880), *The geology of the oil regions of Warren, Venango, Clarion, and Butler Counties*, Pennsylvania Geological Survey, 2nd ser., Report III, p. 23-33.

11. PIKES ROCKS (continued)



APPALACHIAN PLATEAUS PROVINCE

GLACIATED SECTION



16. QUAKERTOWN FALLS

COUNTY: Lawrence

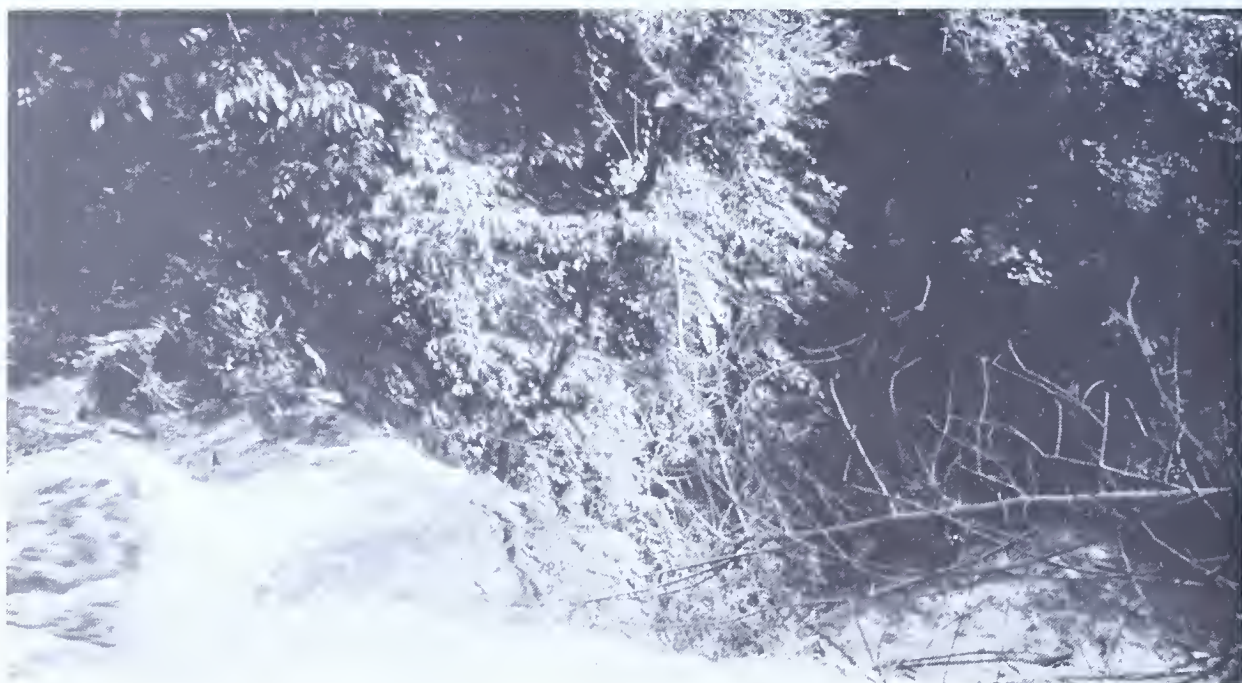
TOWNSHIP: Mahoning

QUADRANGLE: Campbell, Ohio-Pennsylvania

LOCATION: One-half mile east of the Ohio-Pennsylvania border and about 0.7 mile northwest of the village of Hillsville.

REMARKS: The falls are best viewed from near the Pittsburgh and Lake Erie Railroad tracks at the junction with U. S. Route 224. A 50-foot waterfall and a steep-walled valley mark the path of Quakertown Run flowing into the Mahoning River. Waterfalls of this magnitude are very rare in western Pennsylvania.

I. C. White wrote the following in 1879 (p. 194 in reference below): "The run having leaped by a single bound into a deep and narrow cañon, bordered on either side by immense vertical and overhanging cliffs of sandstone, passes on down through the same amid the wildest scenery. This locality is a noted resort for picnic parties, since



APPALACHIAN PLATEAUS PROVINCE

GLACIATED SECTION



in the deep and narrow recesses of the miniature cañon are many attractive nooks where the meridian sun never shines."

The Upper Connoquenessing sandstone (Pottsville Group, Pennsylvanian age) forms the cliff rock of the falls. This sandstone is hard, coarse grained, massive, and white. Immediately under the sandstone is a foot-thick coal named the Quakertown coal for this locality.

Very neat and ornate initials and the date '77 are carved into the rocks at the falls. I. C. White studied the geology of this area in the summer of 1877, and he and his assistants may have been responsible for these carvings.

REFERENCE:

I. C. White (1879), *The geology of Lawrence County, Pennsylvania Geological Survey, 2nd ser., Report of Progress 1877, v.QQ, 336 p.*

17. SLIPPERY ROCK CREEK GORGE

COUNTY: Lawrence TOWNSHIPS: Slippery Rock and Perry

QUADRANGLE: Portersville

LOCATION: Immediately west of the Lawrence-Butler County line near Portersville on U.S. Route 19.

REMARKS: The striking scenery of the deep gorge of Slippery Rock Creek flowing through McConnells Mill State Park is the result of the glaciation of this area several tens of thousands of years ago; the park and gorge extend more than 4 miles in length.

At **Spillway Falls** (18), a large volume of water plunged over the rim of the Homewood Sandstone Member of the Curwensville Formation (Pottsville Group, Pennsylvanian age) with enough energy to quickly enlarge and deepen the gorge. As the ice retreated, more spillways were opened. One of these north of Rose Point, **Muddy Creek Falls** (19), marks the last discharge channel from glacial Lake Arthur. Here Muddy Creek valley hangs above Slippery Rock Creek; the stream plunges about 100 feet over a very scenic falls.

The **Slippery Rock** (20), which gave its name to the stream, a town, an oil field, an oil sand, a college, and a local football team, is a slab of Homewood sandstone along the east bank of the creek opposite Camp Allegheny. The rock is very slippery due to an oil seep, which occurs at the point where the stream was forded on foot and horseback by Indians and early settlers.

Slippery Rock Creek Gorge, over 400 feet in depth, has a wealth of rocky cliffs, hanging valleys, and waterfalls. It is a registered National Natural Landmark.

REFERENCES: Bushnell, Kent (1975), *McConnells Mill State Park: Slippery Rock Creek Gorge*, Pennsylvania Geological Survey, 4th ser., Park Guide 9.

APPALACHIAN PLATEAUS PROVINCE

GLACIATED SECTION



Lytle, Virginia, and Lytle, W. S. (1974), *But is there really a Slippery Rock?*, Pennsylvania Geology, v. 5, no. 1, p. 4-8.

Lytle, W. S. (1970), *Moraine State Park*, Pennsylvania Geological Survey, 4th ser., Park Guide 4.

21. TAMARACK SWAMP

COUNTY: Warren

TOWNSHIP: Columbus

QUADRANGLE: Columbus

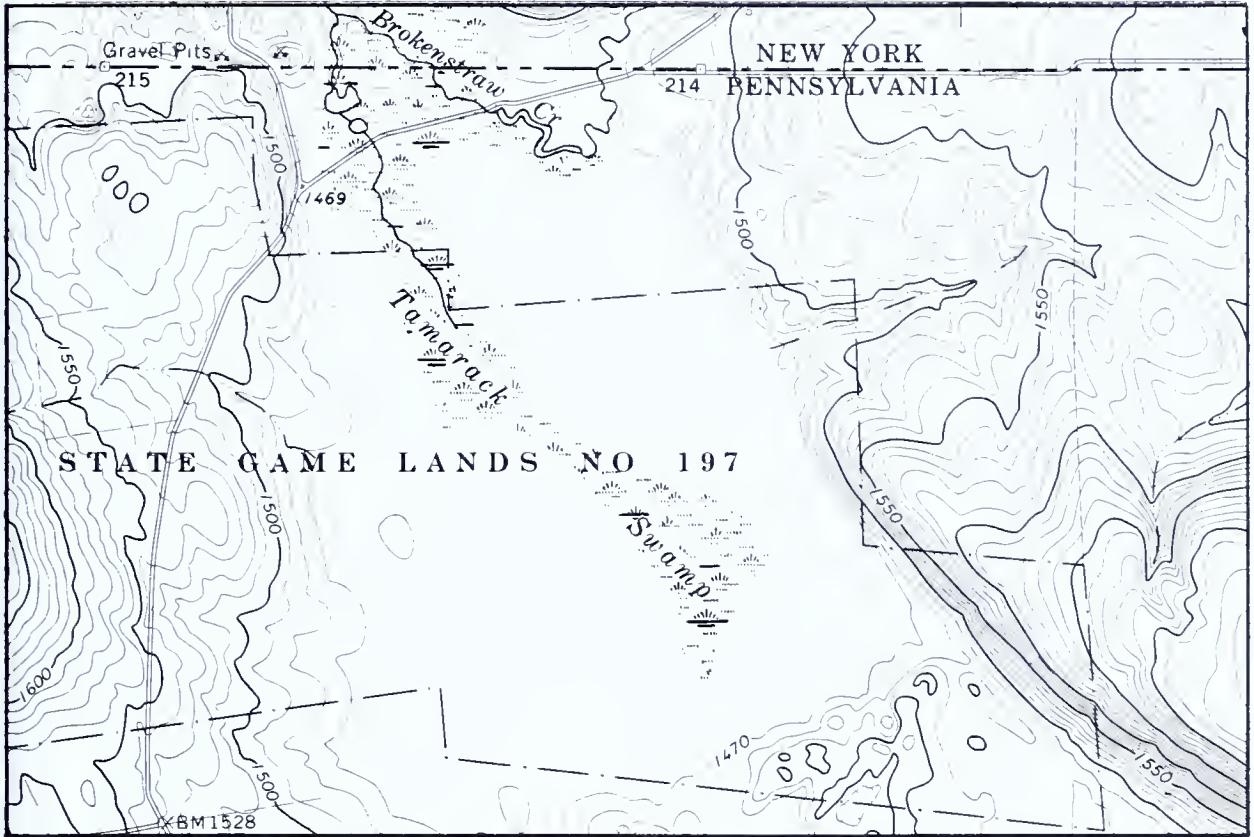
LOCATION: Approximately 27 miles southeast of Erie and 4 miles north of the village of Columbus, Warren County; included within State Game Lands No. 197 on the Pennsylvania-New York border.

REMARKS: A wide, deeply cut channel of Brokenstraw Creek was dammed during the Great Ice Age in Pennsylvania by a kame moraine during the retreat of the ice. This moraine caused a reversal in drainage direction and the eventual abandonment of the channel. Impervious clays and silts in this ancient channelway underlie Tamarack Swamp and are part of its origin. Poor drainage and great accumulations of organic matter have produced the bog, which is the finest example of a northern bog in Pennsylvania. The swamp is a registered National Natural Landmark.



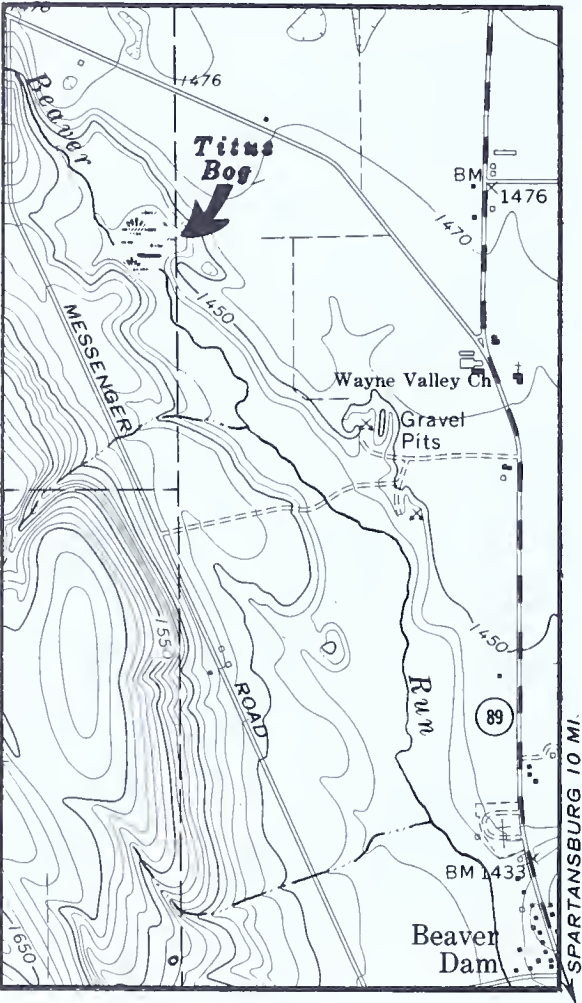
APPALACHIAN PLATEAUS PROVINCE

GLACIATED SECTION



NOTES:

22. TITUS BOG



COUNTY: Erie

TOWNSHIP: Amity

QUADRANGLE: Union City

LOCATION: Approximately 20 miles southeast of Erie; 4.5 miles south of the Borough of Wattsburg.

REMARKS: A marl bog that contains an acid sphagnum mat surface; this bog and the nearby Wattsburg Bog are excellent examples of sphagnum bogs surrounded by a well-developed swamp forest; both bogs are registered National Natural Landmarks.





23. WEST LIBERTY ESKER

COUNTY: Butler

TOWNSHIP: Worth

QUADRANGLE: Slippery Rock

LOCATION: Between West Liberty and Jacksonville.

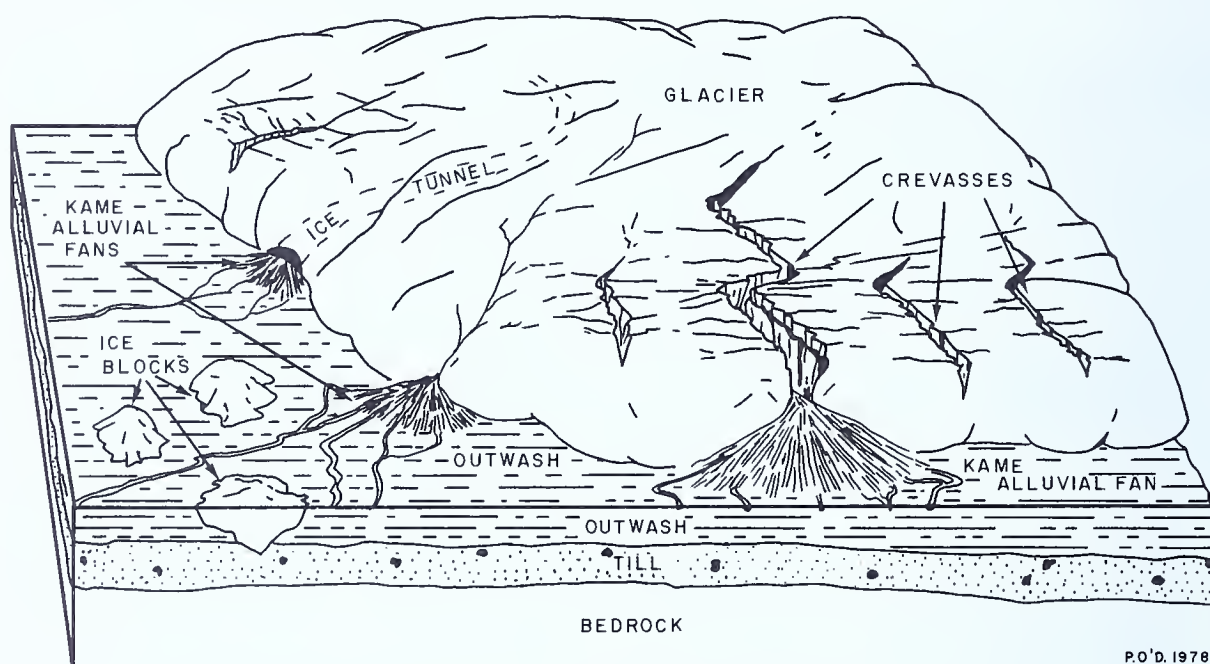
REMARKS: This 3-mile-long esker is probably the best remaining example of this type of glacial deposit in western Pennsylvania. The esker was formed during the close of the Wisconsin glacialiation, and is also known as the **Miller Esker** and **West Liberty "Hogback."**

Eskers are ridge-shaped sand and gravel deposits formed during the melting of a glacier. The ridge form marks the trace of a glacial meltwater stream that is confined within the ice mass. Esker ridges are always associated with the stagnation phase of the glacial episodes.

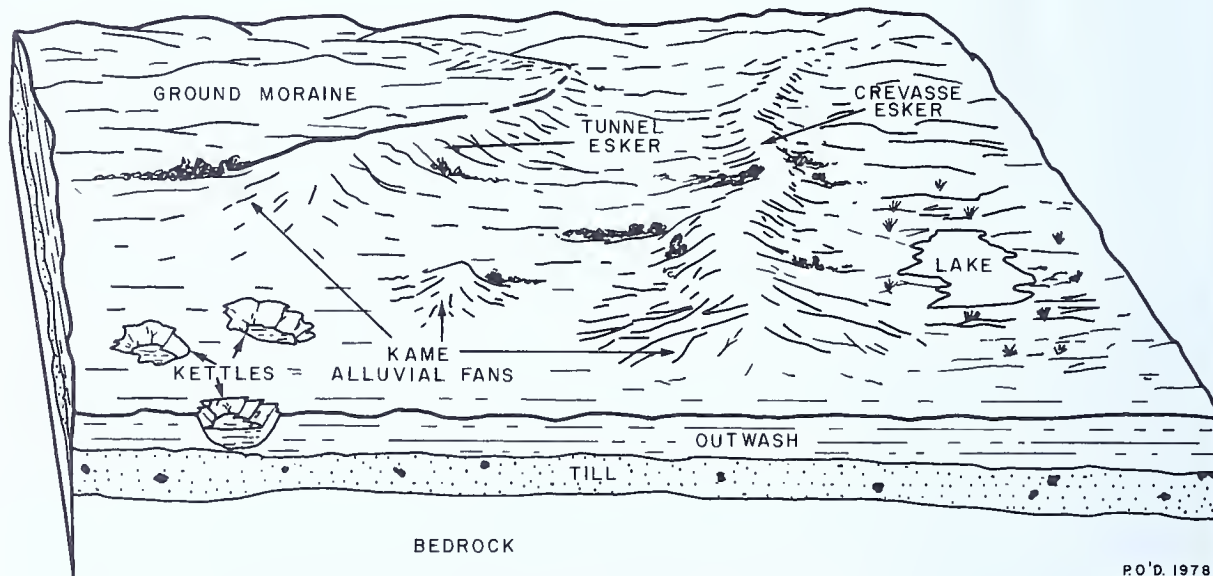
There are two major ways that the esker ridge can form: 1) in an ice tunnel along the base of or within the stagnated ice mass, and 2) as a meltwater channel deposit or crevasse filling on the surface of the ice.



23. WEST LIBERTY ESKER (continued)



DURING GLACIER STAGNATION



AFTER GLACIER RETREATS

(Drawings by Patricia Book, Department of Geology, University of Iowa, Ames, Iowa)

The surface expressions of the resulting types of eskers are quite similar. A ridge will be formed, it will be somewhat sinuous, and it will be composed primarily of gravel. The distinctive difference in the surface expression is that the crevasse-filling type will have a tendency to form angular bends and the long segments (i.e., the unbended segments) will be nearly parallel. The ridge formed in an ice tunnel will have more of a sinuous-meander pattern characterized by sweeping meander bends and few straight-line segments.

APPALACHIAN PLATEAUS PROVINCE

GLACIATED SECTION



The internal composition will also differ. The tunnel esker will often have a till blanket draped over the top of the deposit. The till will be indicative of transportation within the ice, showing long-distant movement of material. A pseudoanticline draping of the sediment within the deposit is common. Ice-contact faulting may be present but is usually not extensively developed.

The crevasse filling will have fluvial-type deposition to the surface. There may be some areas that have flow till incorporated into the deposit because supraglacial material flowed into the crevasse from the ice surface. Ice-contact faulting of the sediment is common because the sides of the deposit were held in place by the ice mass, and, when the ice melted away, faulting developed as the sides of the sedimentary mass were let down.

The West Liberty Esker is believed to be a crevasse filling for the following reasons:

- 1) The existence of straight-line segments of the ridge connected by a sharp bend.
- 2) Glaciofluvial gravels are present across the whole ridge.
- 3) Numerous normal, ice-contact faults occur along the edge of the ridge.
- 4) No till blanket has been observed on the ridge.

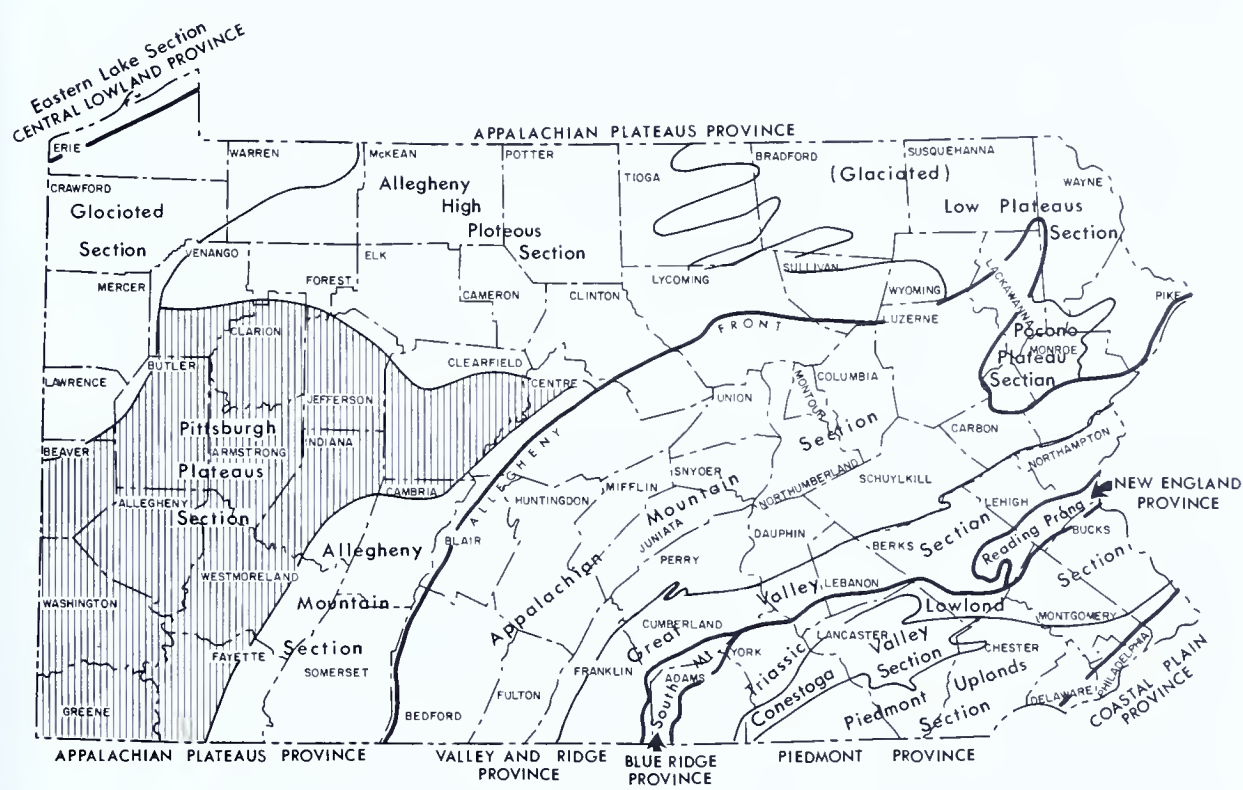
23. WEST LIBERTY ESKER (continued)



APPALACHIAN PLATEAUS PROVINCE— PITTSBURGH PLATEAUS SECTION

TOPOGRAPHY

The Pittsburgh Plateaus section is characterized by rounded hills and open valleys. From Washington northward to Pittsburgh the undulating uplands reach elevations between 1200 and 1250 feet above sea level. Hill summits are generally accordant, and local relief is between 250 and 350 feet. Southward and westward from Washington the ridges become sharp-featured and increase in elevation to a maximum of about 1600 feet in Greene County.



ROCK COLUMN

The rocks are mostly shale, siltstone, sandstone, and conglomerate. The Mississippian, Pennsylvanian, and Permian Systems contain limestones in minor amounts. Shale is the most common rock type of the section, making up more than 50 percent of the entire rock sequence.

OUTSTANDING SCENIC GEOLOGICAL FEATURES OF PENNSYLVANIA

A description of the rock units follows:

SYSTEM	ROCK UNIT	DESCRIPTION
Quaternary	Stream alluvium Terrace deposits	Sand, gravel, silt, and clay. Sand, clay, and gravel on terraces above present rivers; includes the Carmichaels Formation.
Permian	Greene Formation Washington Formation	Soft shale; claystone; thin shaly sandstone; shaly limestone. Light-gray sandstone; gray shaly limestone; some shale, claystone, and thin coals.
Permian and Pennsylvanian	Waynesburg Formation	Sandstone, shale, and limestone; some minable coals.
Pennsylvanian	Monongahela Group Uniontown Formation Pittsburgh Formation Conemaugh Group Casselman Formation Glenshaw Formation Allegheny Group Pottsville Group	Limestone; light-gray sandstone; dark-gray shale; some minable coals. Some shaly gray limestone; numerous poor-quality coals; gray shale; coarse-grained sandstone. Several minable coals; major sandstone units; some shale, claystone, and limestone. Sandstone and shale; contains some conglomerate; locally, minable coals.
Mississippian	Mauch Chunk Formation Burgoon Sandstone Shenango Formation	Red shale, siltstone, and sandstone. Sandstone, conglomerate, siltstone, and shale. Three sandstone intervals separated by shale interbedded with thin siltstone and sandstone.

ROCK STRUCTURE

The major structural feature is the broad, shallow, spoon-shaped depression that lies between Cincinnati on the west and Chestnut Ridge on the east. The deepest part of the trough lies in southwestern Greene County. Northward and southward the axis rises gently, so that successively older formations crop out in concentric bands around the center of the depression.

Superposed upon this trough are a number of secondary folds, which in the western half of the trough are very gentle but toward the east become progressively deeper and closer.

Exposures of faults are lacking. Subsurface drilling for natural gas, however, has proved that faulting of considerable magnitude occurs at depth. Surface evidence of minor faulting has been noted.



24. BEARTOWN ROCKS

COUNTY: Jefferson

TOWNSHIP: Heath

QUADRANGLE: Sigel

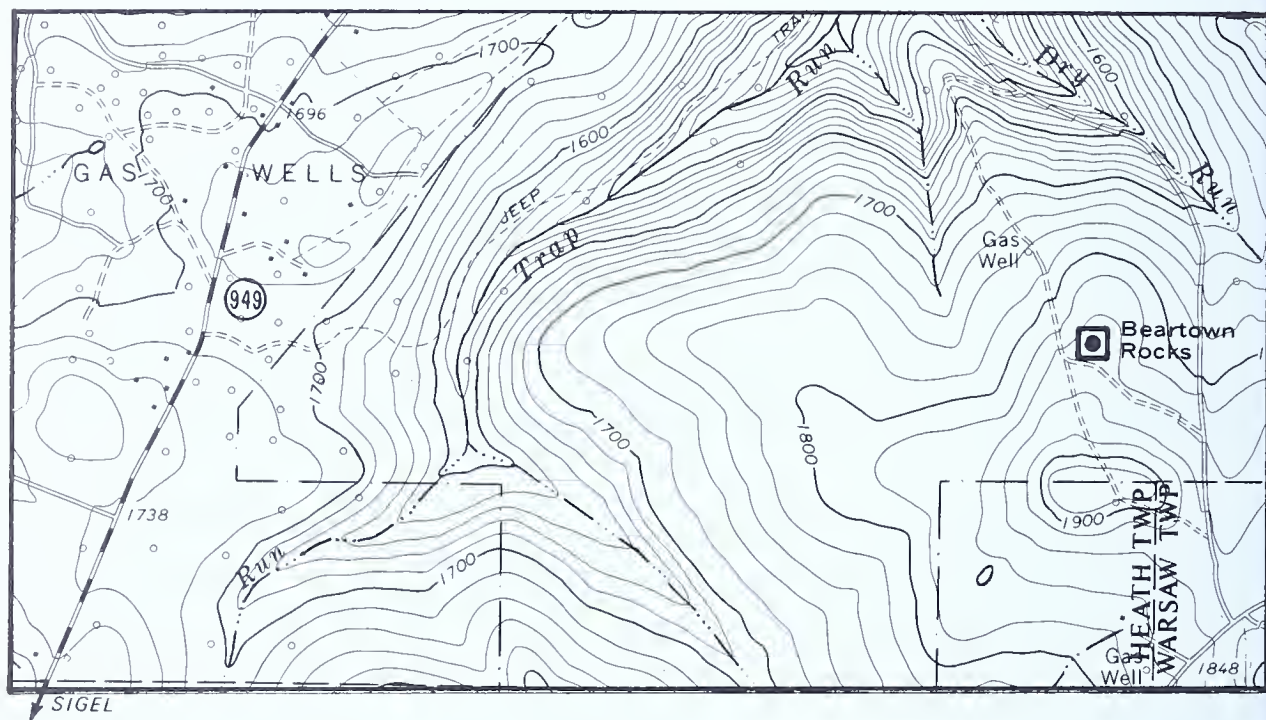
LOCATION: About 3.5 miles northeast of the village of Sigel; 1.5 miles east of Pa. Route 949; within Kittanning State Forest and near Clear Creek State Park.

REMARKS: A "rock city" (large blocks of rock that have weathered extensively along joint cracks, producing interconnected passageways, tunnels, and crevices); blocks of sandstone and conglomerate of the Pottsville Group (Pennsylvanian age). The site is immediately north of the Kellersburg anticlinal axis and is surrounded by one of the Commonwealth's major natural gas fields.

Stahlman Roundtop (25), 2 miles south of Beartown Rocks, is a weathered remnant of basal sandstones of the Allegheny Group.



24. BEARTOWN ROCKS (continued)





26. BIG KNOB

COUNTY: Beaver

TOWNSHIP: New Sewickley

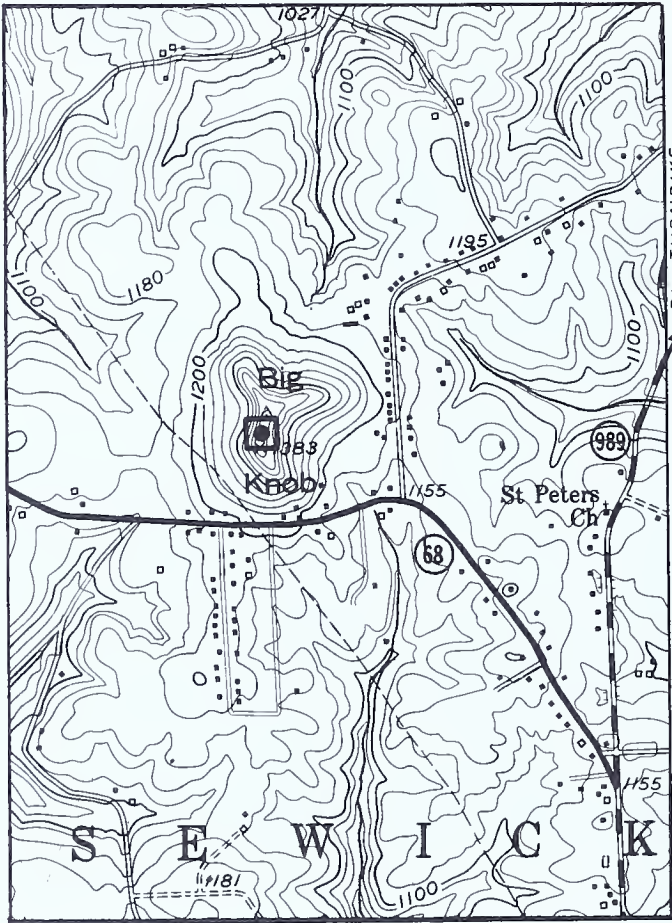
QUADRANGLE: Baden

LOCATION: Adjacent to Pa. Route 68, 1.9 miles south of Unionville.

REMARKS: At elevation 1383 feet, this peak is the highest point in the county. Big Knob is an erosional remnant of the old plateau surface; the knob lies in the trough of a gently plunging syncline and is an excellent example of a "syncline mountain." Drainage from Big Knob is radial in pattern, and the hill is the result of the headward erosion of this drainage system that has left the youngest rocks standing high in relief above the surrounding terrain. The knob is capped by the Morgantown sandstone, the lowest resistant rock unit of the Casselman Formation (Conemaugh Group); the Ames limestone crops out at an elevation of about 1260 feet and forms a bench around the hill at this elevation.



26. **BIG KNOB** (continued)



NOTES:

APPALACHIAN PLATEAUS PROVINCE

PITTSBURGH PLATEAUS SECTION



27. BLOOM RUN VISTA

COUNTY: Clearfield

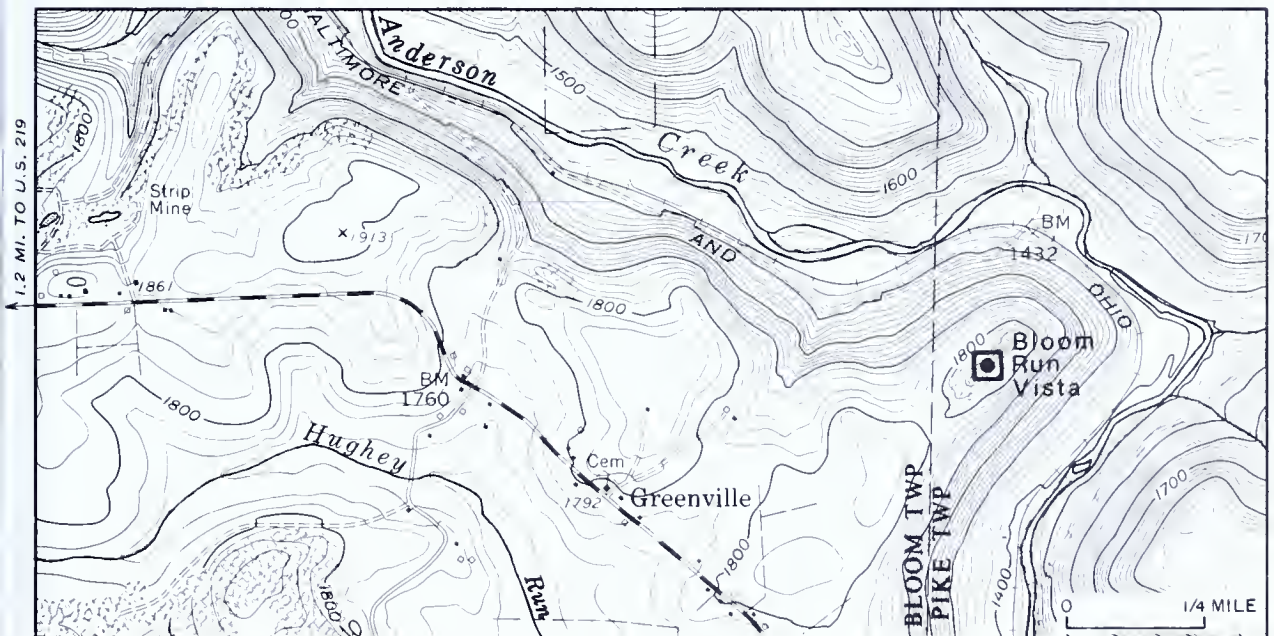
TOWNSHIP: Pike

QUADRANGLE: Elliott Park

LOCATION: Four and 35-hundredths miles northwest of Curwensville; approximately 500 feet above Anderson Creek at the site of an abandoned sandstone quarry.

REMARKS: The Homewood Sandstone Member of the Curwensville Formation (Pottsville Group, Pennsylvanian age) caps the hill at this site; the sandstone is over 50 feet thick, coarse grained, light brown, massive, and was quarried here for building stone. The Rockville Bridge, which spans the Susquehanna River north of Harrisburg and is the longest stone arch bridge in the world, was built in part from this sandstone.

One of the best vistas of the Pittsburgh Plateau is visible here from the rim of the Anderson Creek gorge.



27. BLOOM RUN VISTA *(continued)*

- REFERENCES: Ashley, G. H. (1940), *Geology and mineral resources of the Curwensville quadrangle*, Pennsylvania Geological Survey, 4th ser., Atlas 75, 140 p.
- Edmunds, W. E., and Berg, T. M. (1971), *Geology and mineral resources of the southern half of the Penfield 15-minute quadrangle, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Atlas 74cd, 184 p.

NOTES:



28. BRADYS BEND

COUNTY: Clarion

TOWNSHIP: Brady

QUADRANGLE: East Brady

LOCATION: About 2 miles east of the Borough of East Brady along Pa. Route 68 near mile 71 on the Allegheny River.

REMARKS: One of the finest examples in Pennsylvania of an entrenched meander; 6 miles long and only 0.5 mile across the neck. An overlook is located on the north side of the neck, 500 feet above the Allegheny River.



28. BRADYS BEND (continued)





29. CALIFORNIA OVERLOOK

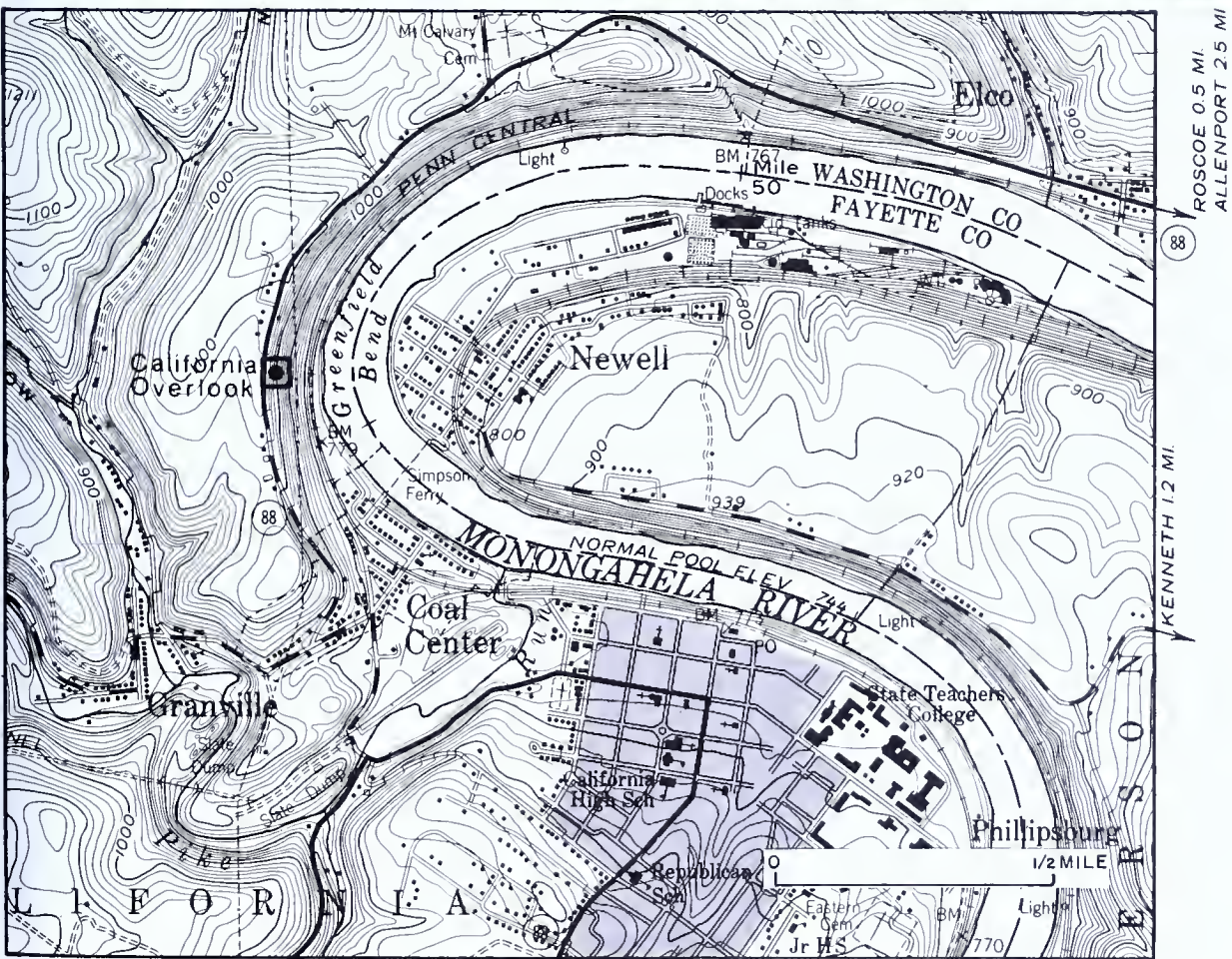
COUNTY: Washington

TOWNSHIP: California

QUADRANGLE: California

LOCATION: Along Pa. Route 88 about a mile north of the Borough of California.

REMARKS: Overlook of the Monongahela River and the communities of Newell, Coal Center, and California; the meander in the river is called **Greenfield Bend** (30)



31. COLD VALLEY

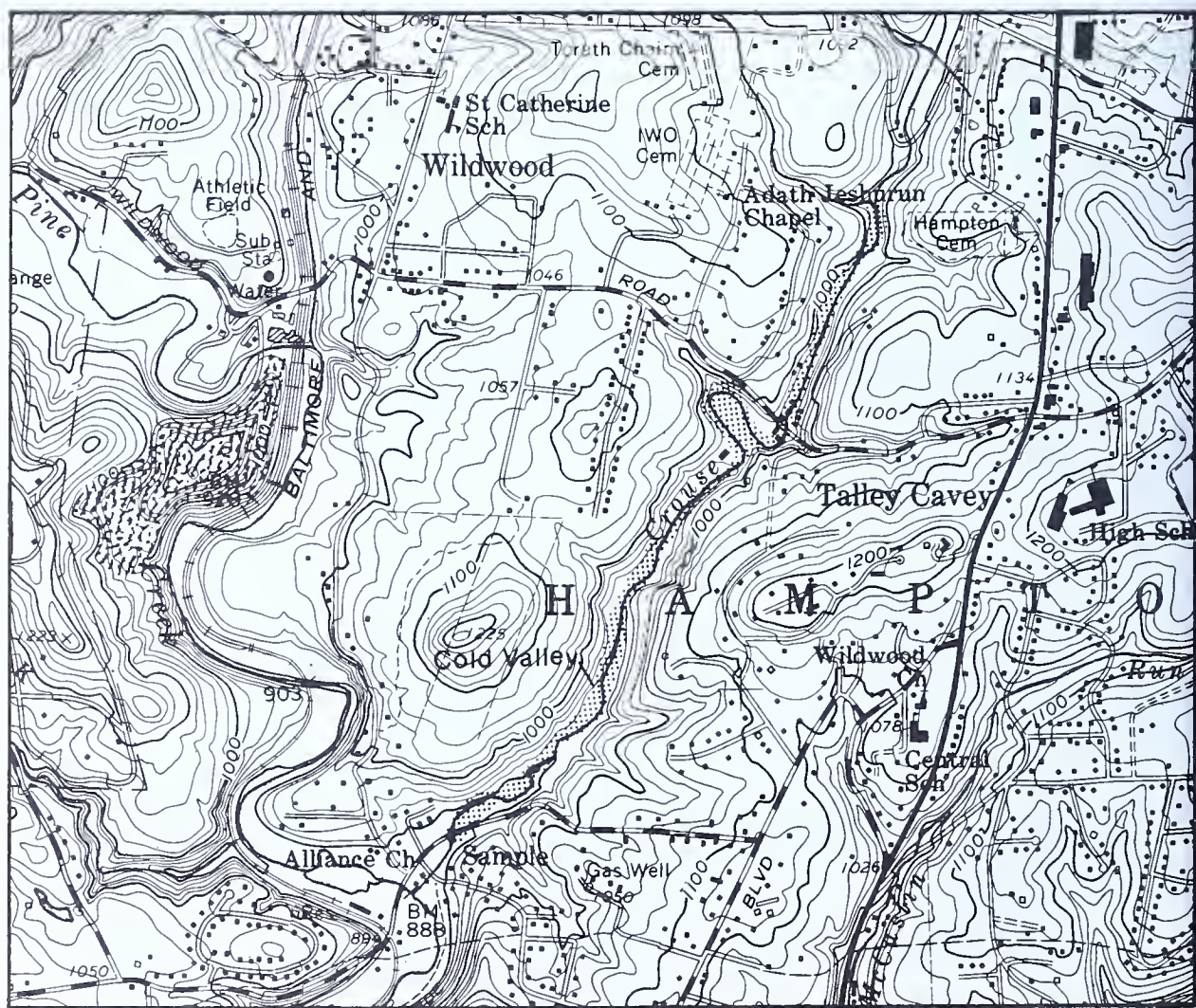
COUNTY: Allegheny

TOWNSHIP: Hampton

QUADRANGLE: Glenshaw

LOCATION: A steep-walled valley along Crouse Run, west of Hampton Cemetery and the village of Talley Cavey.

REMARKS: The valley bottom remains cold through much of the summer months. Narrow valley walls channel and trap winter air currents so that the valley bottom remains cool throughout the year. The wild-flower snow trillium (*Trillium nivale*) is found here, as well as other plants normally found in more northern climates. Rocks exposed in the valley walls are sandstones, siltstones, and shales of the Glenshaw Formation of the Conemaugh Group (Pennsylvanian age).



APPALACHIAN PLATEAUS PROVINCE

PITTSBURGH PLATEAUS SECTION



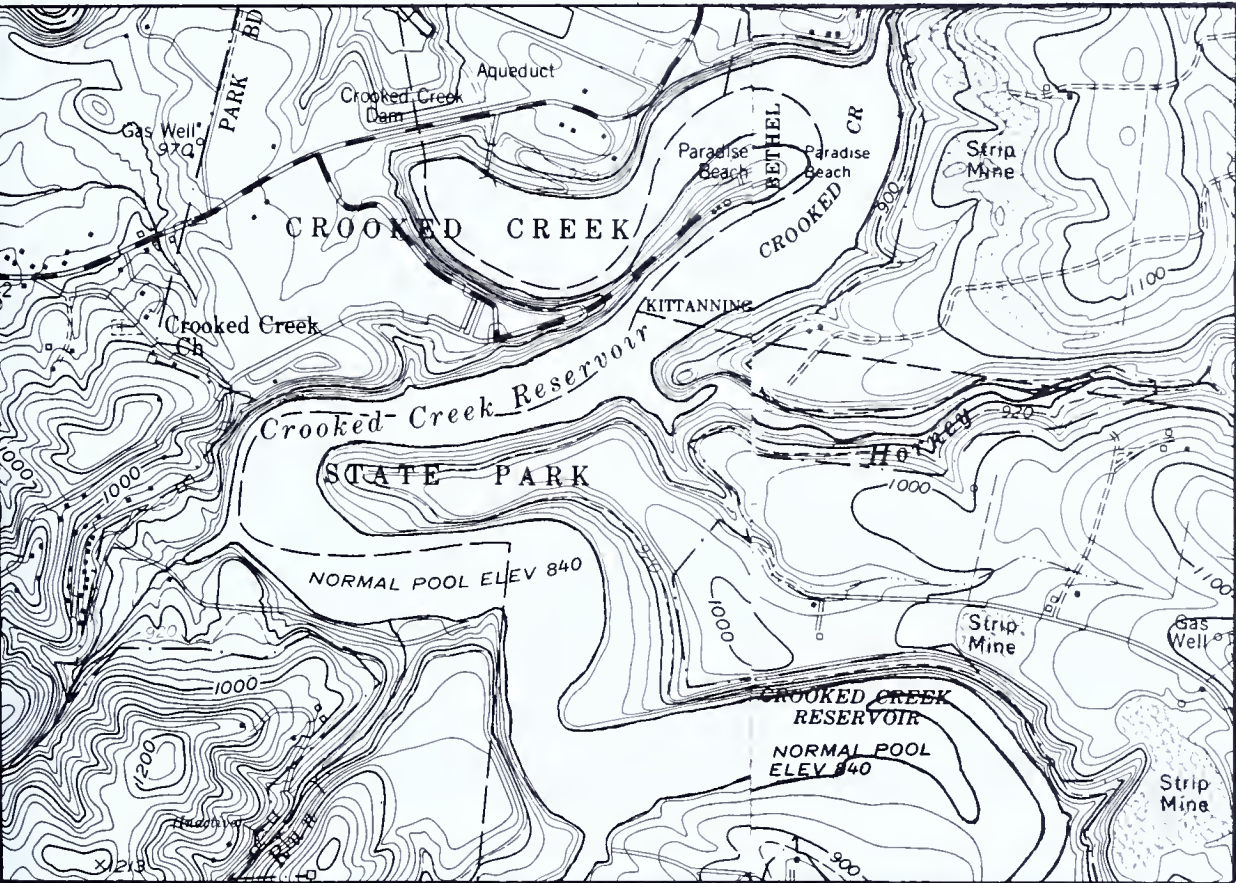
32. CROOKED CREEK

COUNTY: Armstrong TOWNSHIPS: Manor, Bethel, and Burrell

QUADRANGLE: Leechburg

LOCATION: At Crooked Creek State Park along Crooked Creek, a tributary of the Allegheny River.

REMARKS: A series of closely spaced meanders give the creek its name. An exceptional set of meanders at this site is highly scenic.



33. INDIAN GOD ROCK

COUNTY: Venango

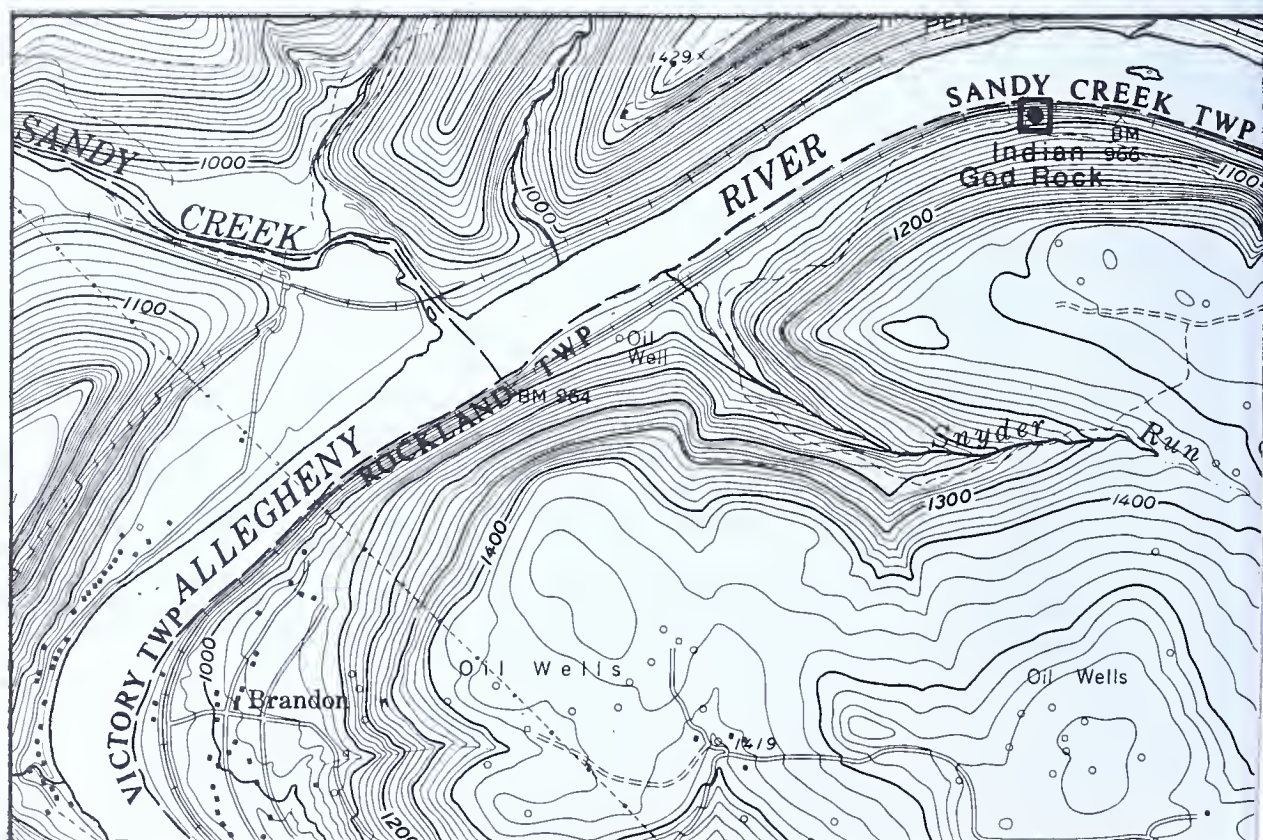
TOWNSHIP: Rockland

QUADRANGLE: Kennerdell

LOCATION: On the east bank of the Allegheny River, 2 miles north of the village of Brandon; near the 115-mile post on the Penn Central Railroad tracks.

REMARKS: A large outcrop of sandstone (Cuyahoga Group, Mississippian age) forms a sloping, flat bedding surface facing the river; early Indians carved figures on the face of the rock. Carvings represent their tribes, birds, and animals of the region.

REFERENCE: Swauger, J. L. (1977), *The Indian God Rock petroglyph site 36VE36*, Pennsylvania Archaeologist, v. 47, no. 1, p. 1-13.





34. MEADOWCROFT ROCK SHELTER

COUNTY: Washington

TOWNSHIP: Jefferson

QUADRANGLE: Avella

LOCATION: Two and one-half miles north of Pa. Route 50 at Avella; 100 feet north of Cross Creek.

REMARKS: Oldest archaeological site in the western hemisphere; the location of the earliest known Indian habitat in the United States. Though primarily of archaeological interest, the site does have geologic significance; over 30 radiocarbon dating tests have been performed by the Smithsonian Institute, Washington, D. C. Some of the most sophisticated techniques used at any site in the world, including computer analyses, have been

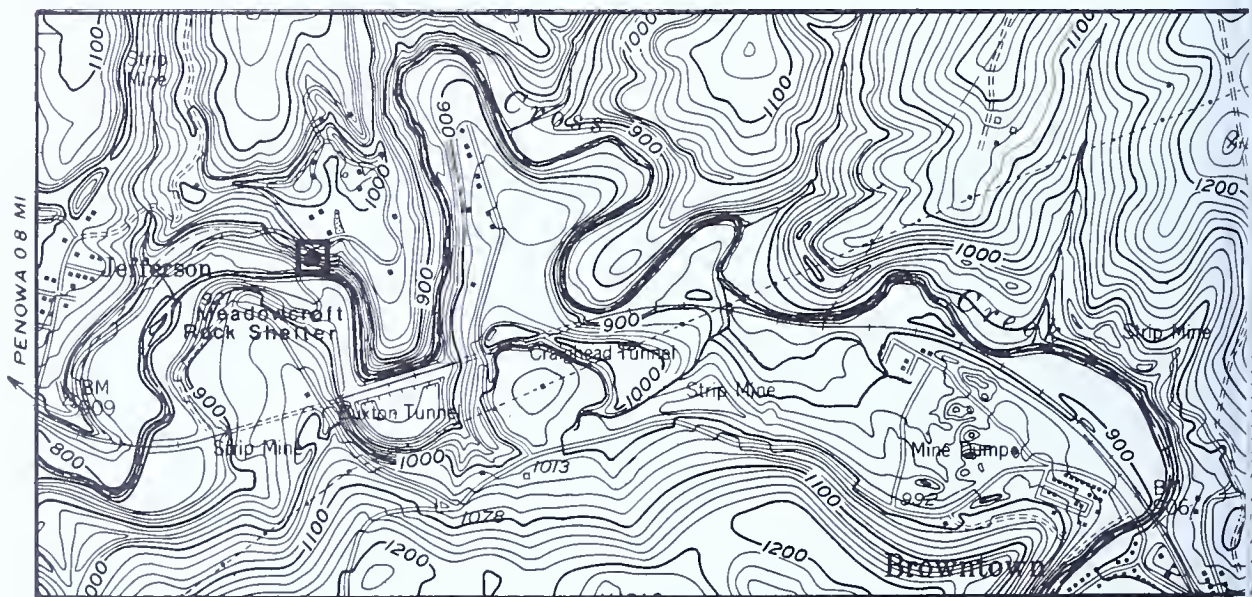


34. MEADOWCROFT ROCK SHELTER (*continued*)

employed. The rock shelter was formed by the differential weathering of massive beds of sandstone, siltstone, and shale (Casselman Formation, Conemaugh Group, Middle to Late Pennsylvanian age).

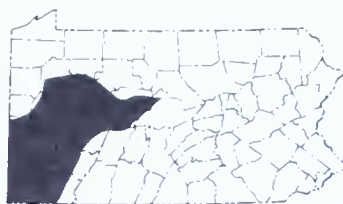
REFERENCES:

- Adovasio, J. M., Gunn, J. D., Donahue, J., Stückenrath, R., and others (1977), *Meadowcroft Rockshelter: Retrospect 1976*, Pennsylvania Archaeologist, v. 47, nos. 2 and 3, p. 1-93.
- Bolles, W. H. (1977), *The Meadowcroft Rockshelter—The earliest evidence of Stoneage man in North America*, Pennsylvania Geology, v.8, no. 6, p. 2-5.
- Smith, Ned (1976), *Meadowcroft—Hunting camp of the ancients*, Pennsylvania Game News, v. 47, no. 4, p. 2-8.



APPALACHIAN PLATEAUS PROVINCE

PITTSBURGH PLATEAUS SECTION



35. MINNIE KNOB

COUNTY: Greene

TOWNSHIP: Perry

QUADRANGLE: Blacksville

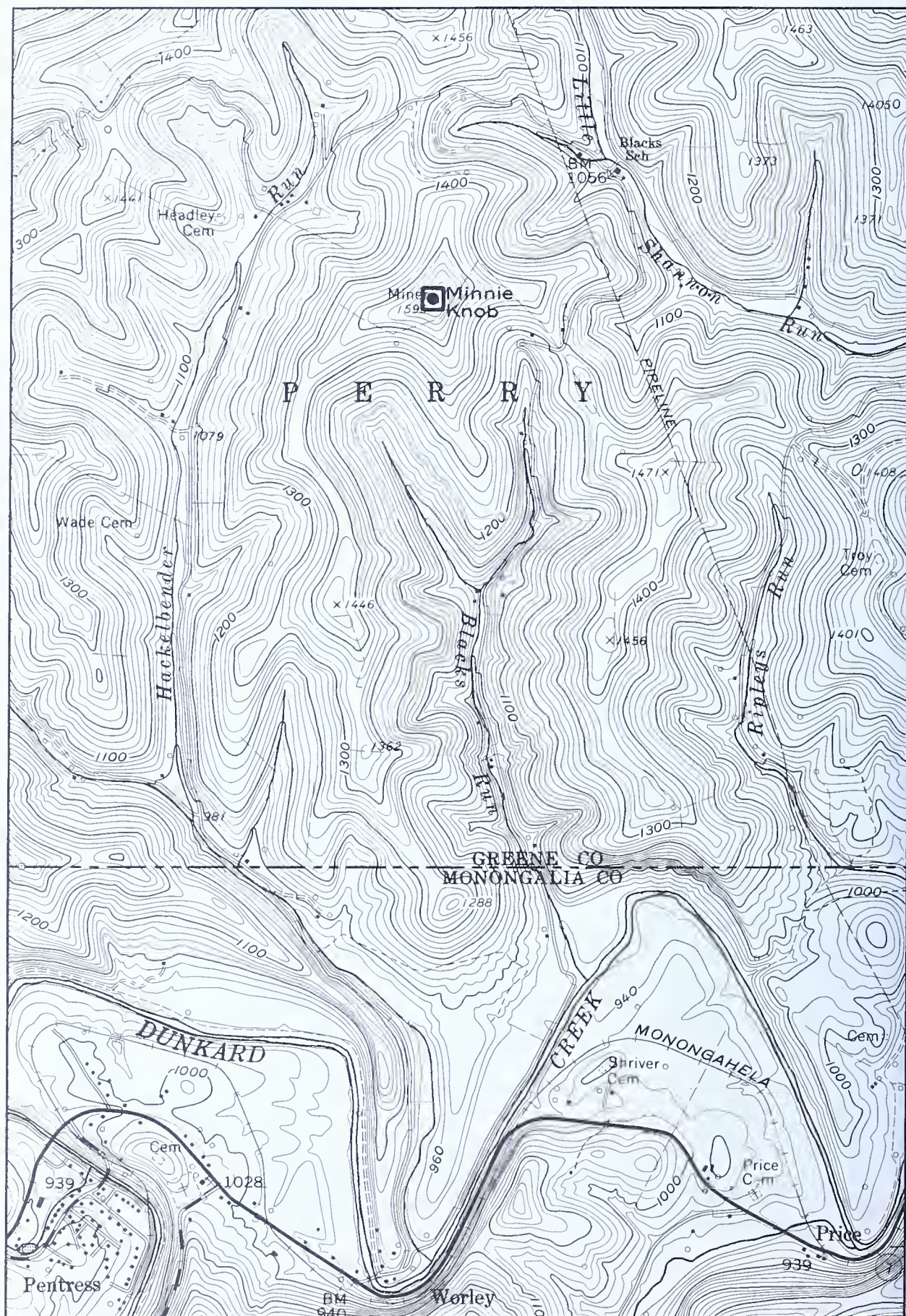
LOCATION: Three and one-half miles east of Blacksville and 1.3 miles north of the Pennsylvania-West Virginia State line.

REMARKS: One of the highest points in Greene County; an excellent view of the Pittsburgh Plateau in southwestern Pennsylvania. The character of the plateau here is one of rounded hills and shallow stream valleys, and most of the land surface is on hillslopes. This character of the plateau is unique to the southwestern part of the Commonwealth. Flat-lying beds of sandstone, shale, and limestone of the Greene Formation (Permian age) underlie Minnie Knob.

REFERENCE: Stone, R. W. (1932), *Geology and mineral resources of Greene County, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., County Report 30, 175 p.



35. MINNIE KNOB (continued)





36. REA BLOCK FIELD

COUNTY: Washington

TOWNSHIP: Cross Creek

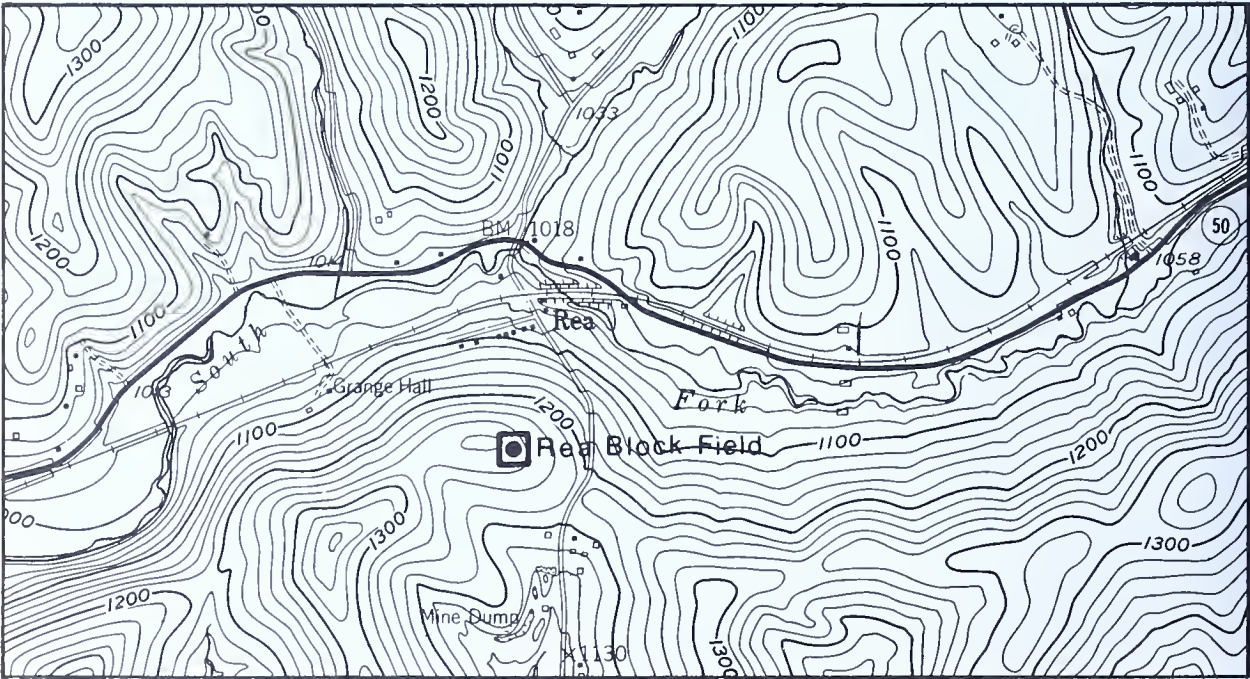
QUADRANGLE: Avella

LOCATION: About one-quarter mile south of Pa. Route 50 at Rea.

REMARKS: Massive sandstone outcrops of the Greene Formation (Permian age); 20 feet to 30 feet high; excellent examples of crossbedding. The name of C. C. Rea and the date 1854 are carved into one of the blocks. This is the only known location where this sandstone crops out in Washington County.



36. REA BLOCK FIELD (continued)





37. TURTLE ROCKS

COUNTY: Centre

TOWNSHIP: Rush

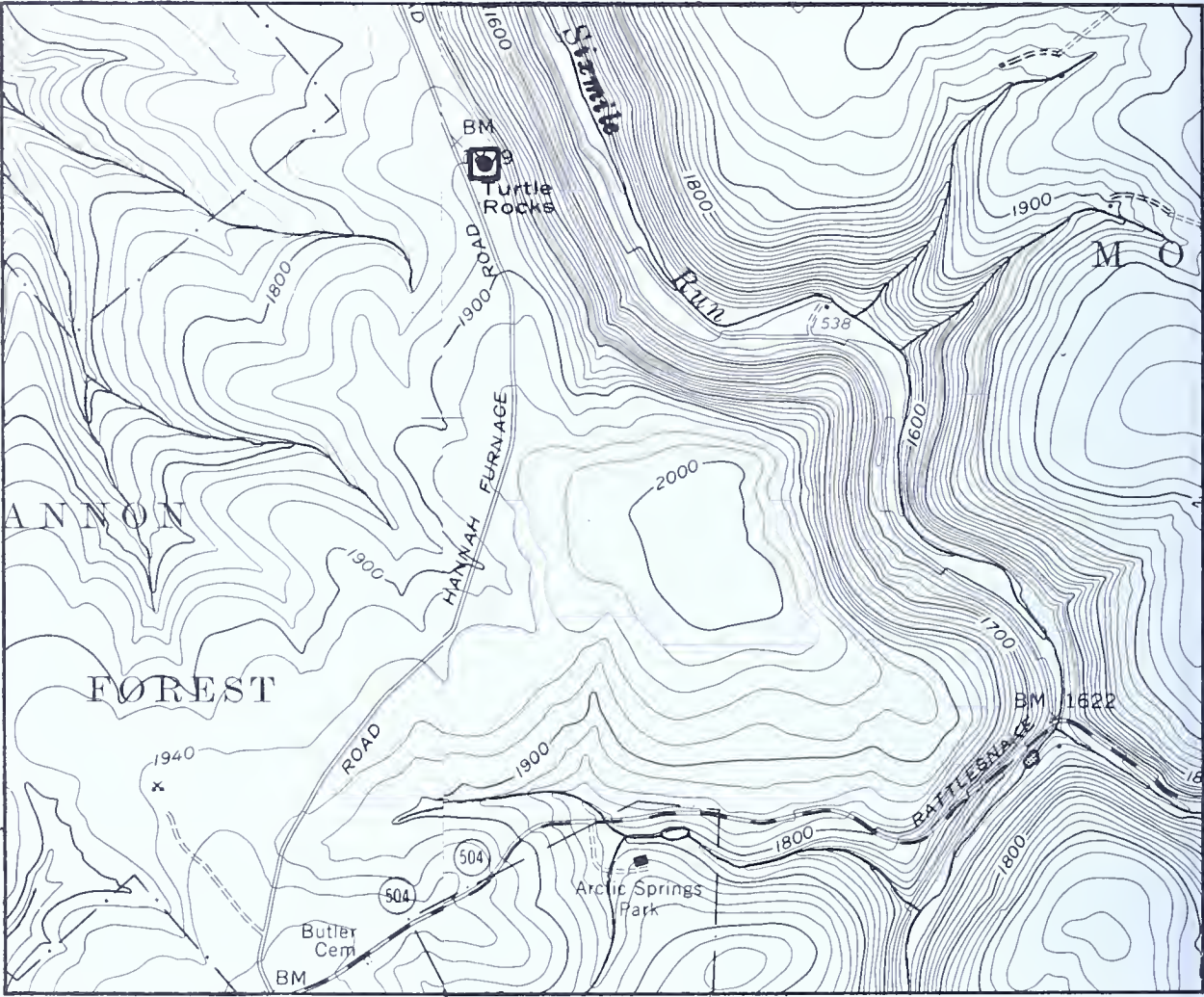
QUADRANGLE: Black Moshannon

LOCATION: Within Moshannon State Forest; about 3.4 miles west of Black Moshannon Dam in Black Moshannon State Park; along Hanna Furnace Road.

REMARKS: An outcrop of flat-lying beds of conglomerate (Burgoon Sandstone, Mississippian age) has weathered in the shape of a sleeping turtle. Nearby, **Hunter Rocks** (38) is the site of an old "sandstone quarry"; cliffs and outcrops of conglomerate still are numerous.



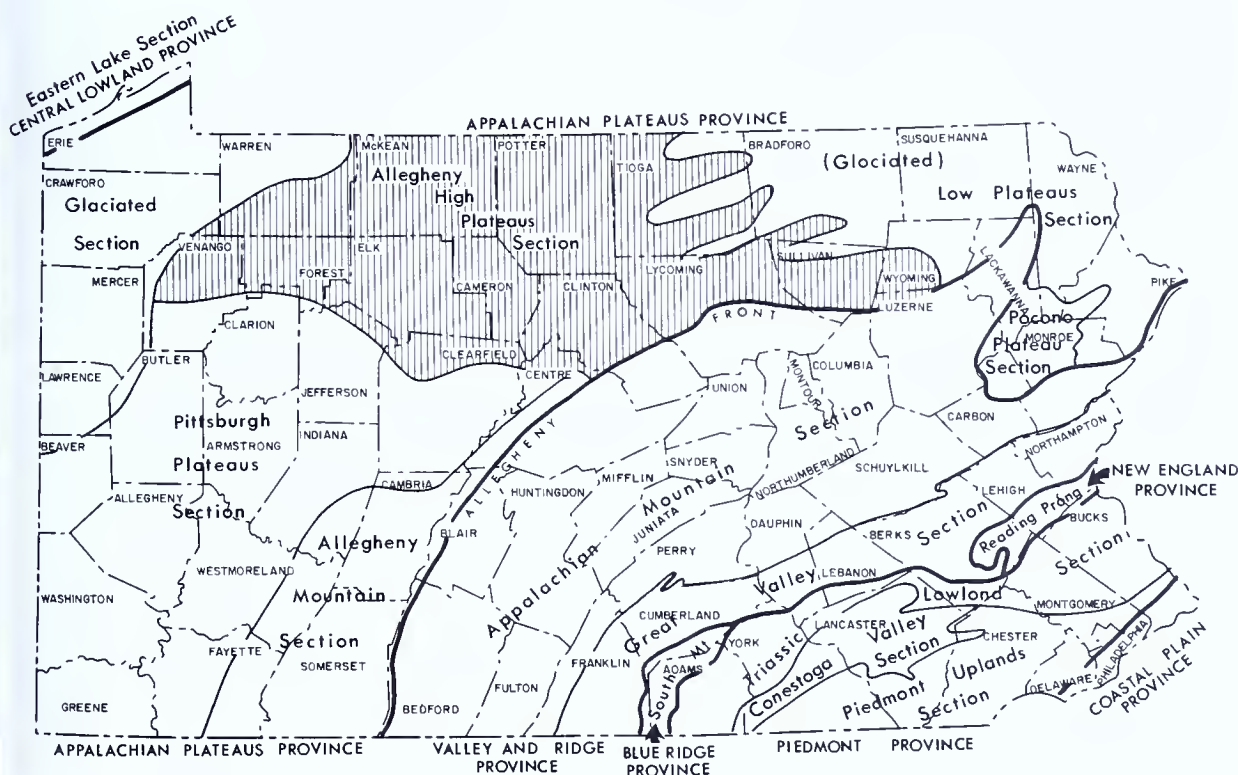
37. **TURTLE ROCKS** *(continued)*



NOTES:

APPALACHIAN PLATEAUS PROVINCE — ALLEGHENY HIGH PLATEAUS SECTION

The Allegheny High Plateaus section is a very rugged, high plateau, deeply dissected by numerous streams. For example, the relief along Sinnemahoning Creek, one of the principal tributaries of the West Branch of the Susquehanna River, exceeds 1000 feet, and the total relief of the section exceeds 1600 feet. Valley walls tend to be steep along major streams and numerous "hollows" and also exist where smaller streams have cut through the rocks. The hills have been rounded by erosion, but slopes are nevertheless steep. During heavy rains, stream levels rise very fast due to either the absence of floodplains or the short lateral extent of floodplains that do exist.



ROCK COLUMN

The rocks present are shale, siltstone, sandstone, and some conglomerate. No limestones occur in the Devonian rocks, but the Pennsylvanian

OUTSTANDING SCENIC GEOLOGICAL FEATURES OF PENNSYLVANIA

System contains some in minor amounts. Shale is the most common rock type in the section.

SYSTEM	ROCK UNIT	DESCRIPTION
Pennsylvanian	Conemaugh Group	Some shaly gray limestone; numerous poor-quality coals; gray shale; coarse-grained sandstone.
	Allegheny Group	Sandstone, conglomerate, shale, fireclay, slate, and numerous coal beds.
	Pottsville Group	Hard coarse quartz conglomerate; white and gray sandstone; brown sandstone and a few thin seams of coal.
Mississippian	Mauch Chunk Formation	Gray and green sandstone; red shale, siltstone, and claystone.
	Burgoon Sandstone	Light-gray to greenish-gray sandstone; occasional shale and siltstone; a few coal beds.
	Shenango Formation	Sandstone, shale, and some siltstone.
	Cuyahoga Group	Shale and siltstone; some sandstone.
Mississippian and Devonian	Burgoon-Catskill transition zone	Sandstone, shale, and siltstone, greenish- or olive-gray; sandstones are thin and flaggy.
Devonian	Oswayo Formation	Greenish-gray sandstone; minor shale units.
	Venango and Catskill Formations	Red, gray, and brown shale and sandstone (Venango); red shale, sandstone, conglomerate, and siltstone (Catskill).
	Chadakoin Formation	Alternating shales and sandstones; fine-grained, gray, fossiliferous.
	Lock Haven Formation	Interbedded shale, sandstone, siltstone, mudstone, and minor conglomerate; olive-gray to olive-brown, fossiliferous.

ROCK STRUCTURE

The major structural features of the section are three synclines, the axes of which trend N30-35°E and which have shallow plunges that terminate their surface expression. From north to south across Bradford County, they are the Windham syncline, Blossburg syncline, and Barclay syncline. All of the folds die out to the east and the rocks become nearly horizontal.

Surface evidence of major faulting is lacking. Drilling in Tioga County has shown, however, that faulting of considerable dimensions has occurred at depth.

APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



39. ALGERINE SWAMP BOG

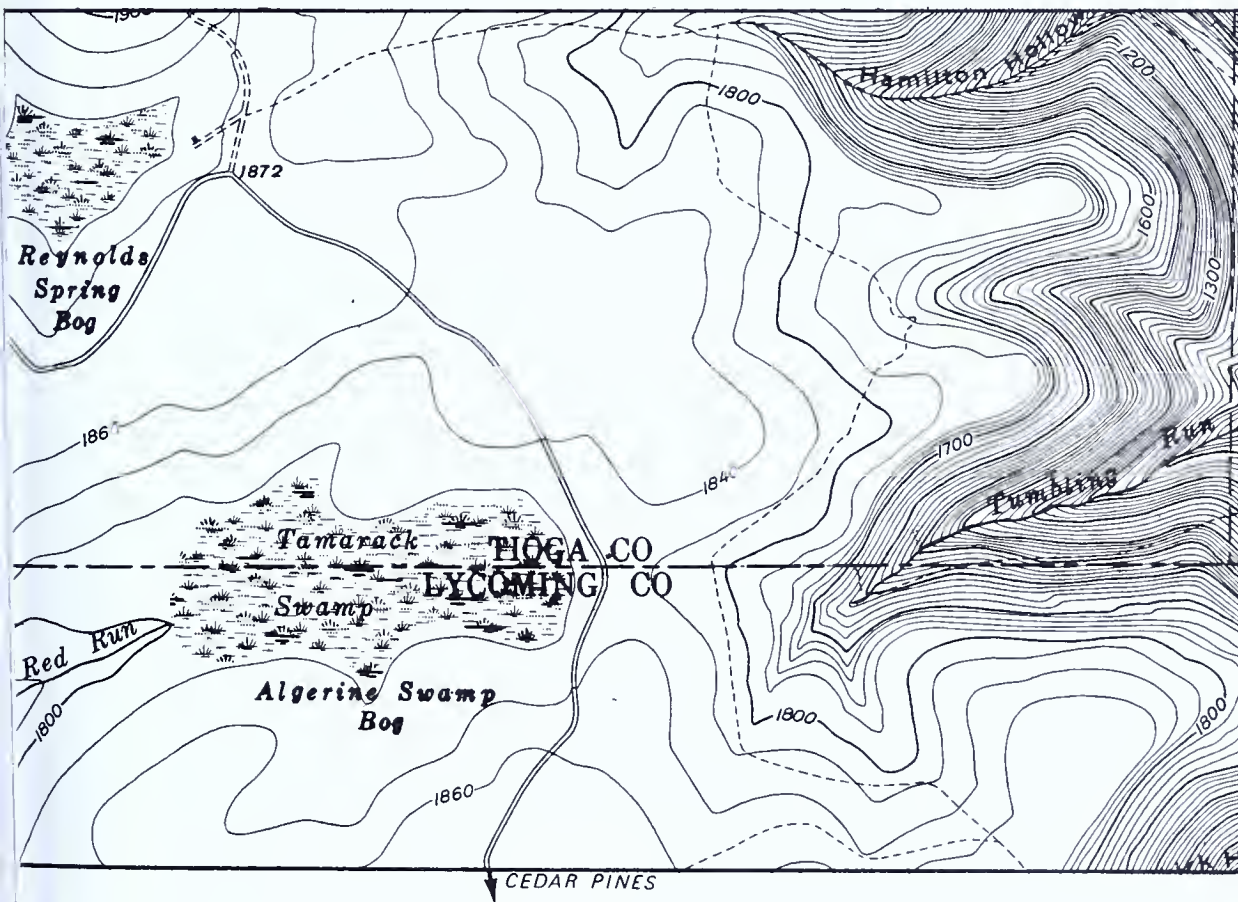
COUNTIES: Tioga and
Lycoming

TOWNSHIPS: Elk (Tioga County);
Brown (Lycoming
County)

QUADRANGLE: Cedar Run

LOCATION: About 3 miles northwest of the village of Cedar Run, in Tioga State Forest.

REMARKS: An outstanding high mountain bog; **Reynolds Spring Bog** (40) is also nearby. The bogs are two of the finest examples of their type in Pennsylvania; both are registered National Natural Landmarks.



41. BARBOUR ROCK

COUNTY: Tioga

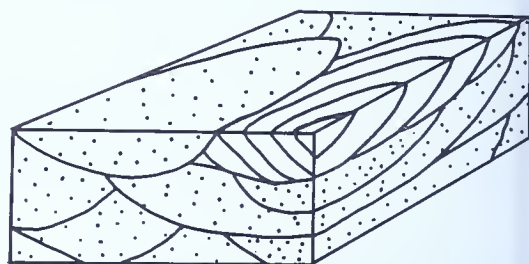
TOWNSHIP: Shippen

QUADRANGLE: Tiadaghton

LOCATION: Approximately 1.5 miles north of Colton Point State Park on Pa. Route 660.

REMARKS: Barbour Rock marks the northern end of Pine Creek Gorge; it provides a spectacular view of the gorge and the adjacent high plateau. Outcrops of gray sandstone (Catskill Formation, Devonian age) are noted for their spectacular crossbedding.

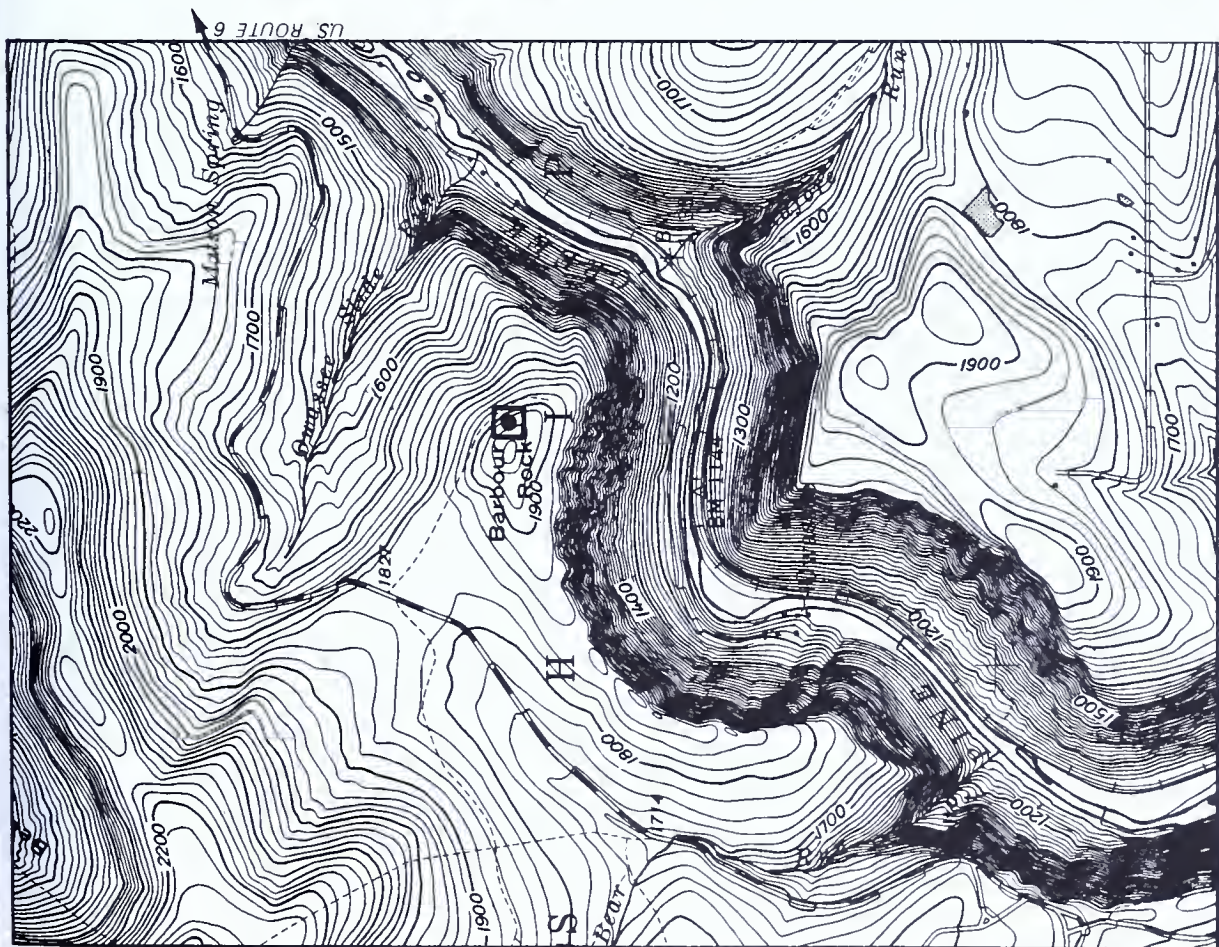
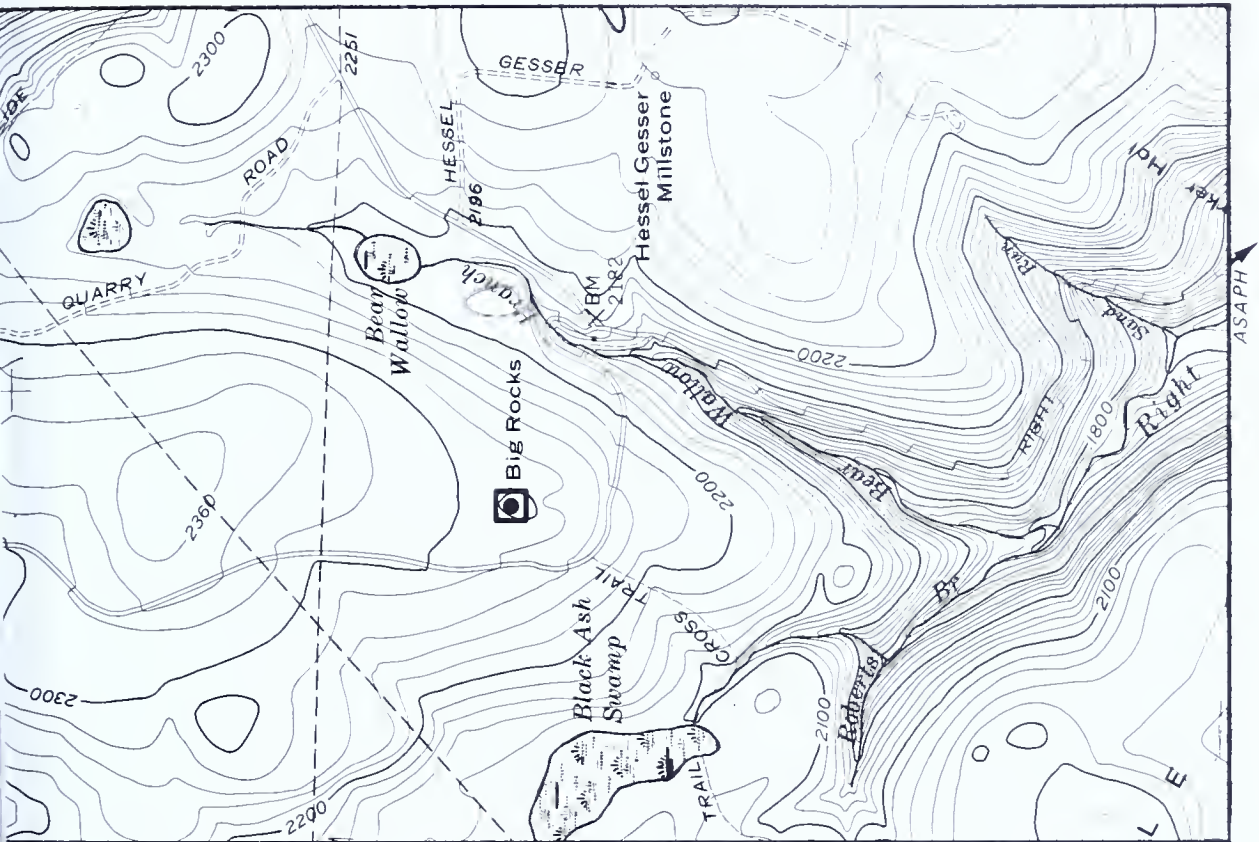
Big Rocks (42) (Asaph quadrangle), located at the northern border of the township, is a similar feature having the same geologic characteristics.



CROSSBEDDING



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



43. BILGER ROCKS

COUNTY: Clearfield

TOWNSHIP: Bloom

QUADRANGLE: Curwensville

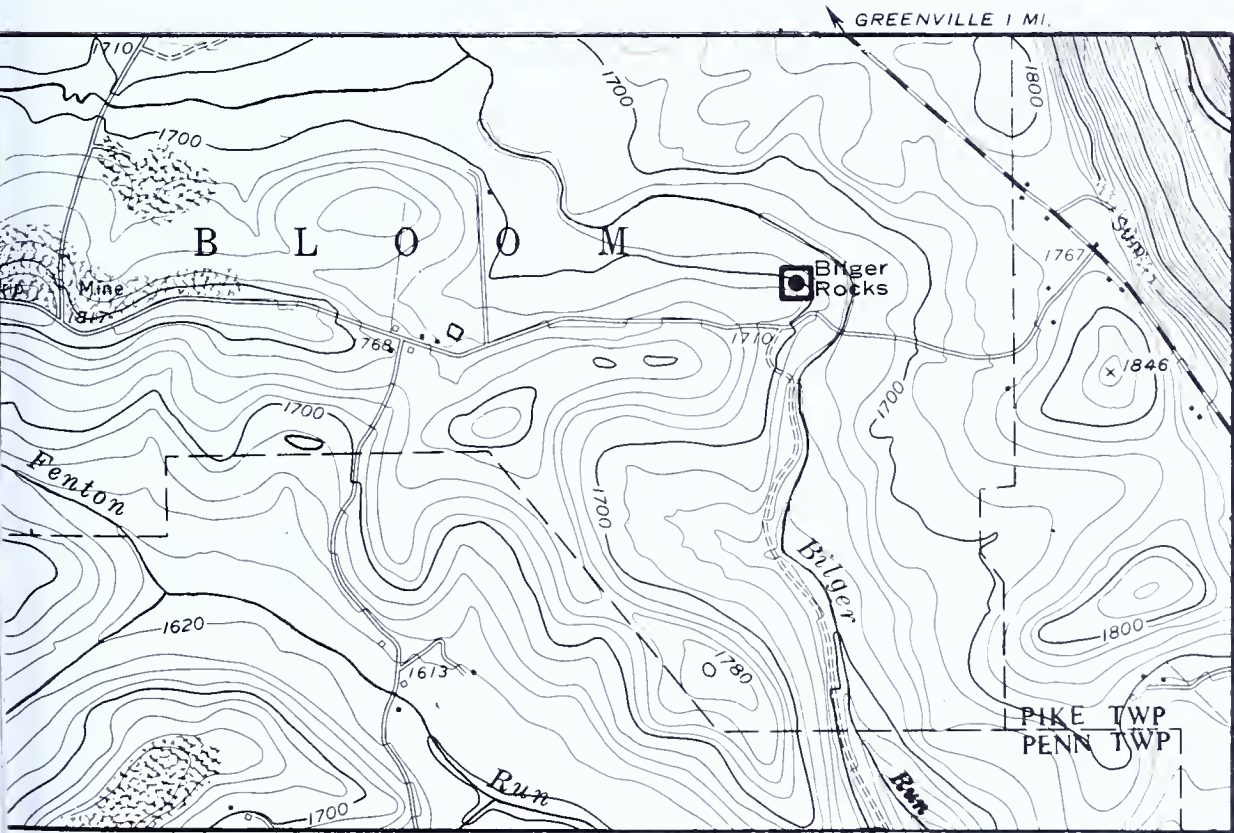
LOCATION: Approximately 4 miles northwest of Curwensville, on Pike Township Route 203.

REMARKS: Huge, highly cross-bedded sandstone blocks have been frost-wedged from the bedrock, forming a small "rock city." The Homewood Sandstone Member (Curwensville Formation, Pottsville Group, Pennsylvanian age) is exposed in a single bed 20 to 25 feet thick. Joint separations vary from a few inches to as much as 15 to 20 feet; chambers have vertical walls 15 to 25 feet in height, connected by narrow passageways of the same height and from 15 inches to 3 feet in width; some of these narrow passageways are 50 feet long.



REFERENCE: Ashley, G. H. (1940), *Geology and mineral resources of the Curwensville quadrangle*, Pennsylvania Geological Survey, 4th ser., Atlas 75, p. 38.

APPALACHIAN PLATEAUS PROVINCE
 ALLEGHENY HIGH PLATEAUS SECTION



44. BLUE ROCK

COUNTY: Elk

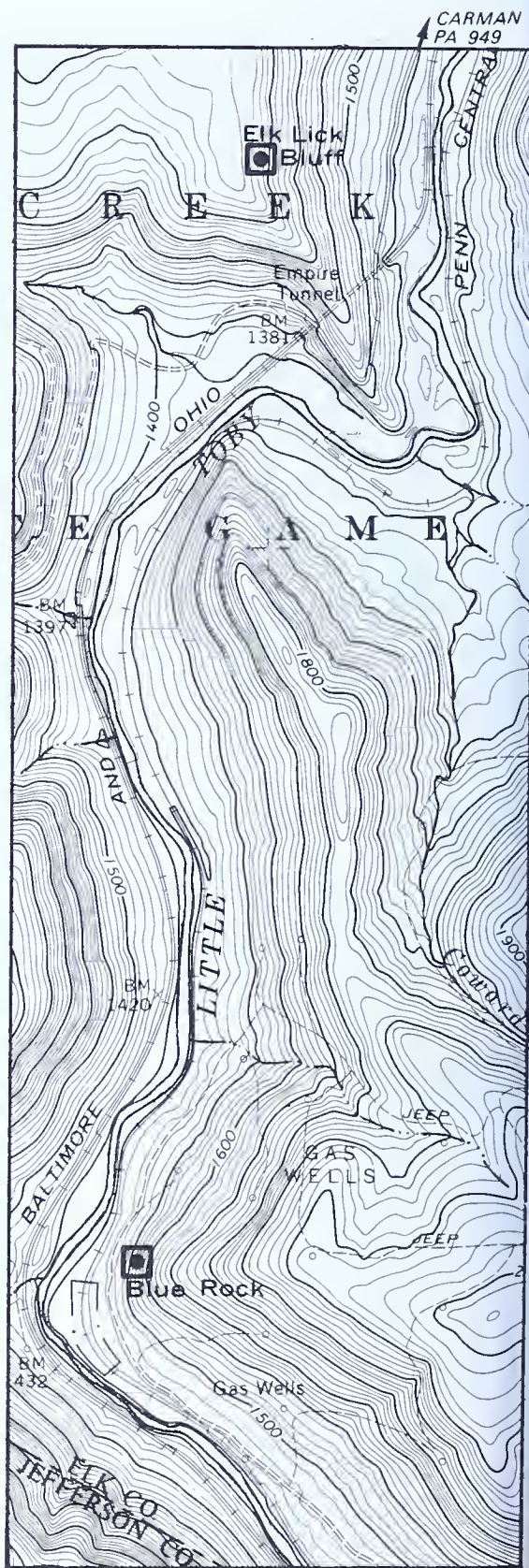
TOWNSHIP: Spring Creek

QUADRANGLE: Carman

LOCATION: Four tenths of a mile north of the Elk-Jefferson County line; 5 miles north of Brockway.

REMARKS: Flat-lying beds of sandstone and conglomerate (Burgoon Sandstone, Mississippian age) have been eroded by Little Toby Creek, resulting in cliffs and escarpments along the creek gorge. **Elk Lick Bluff** (45) is a similar feature nearby.

NOTES:



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



46. BODINE MOUNTAIN OVERLOOK

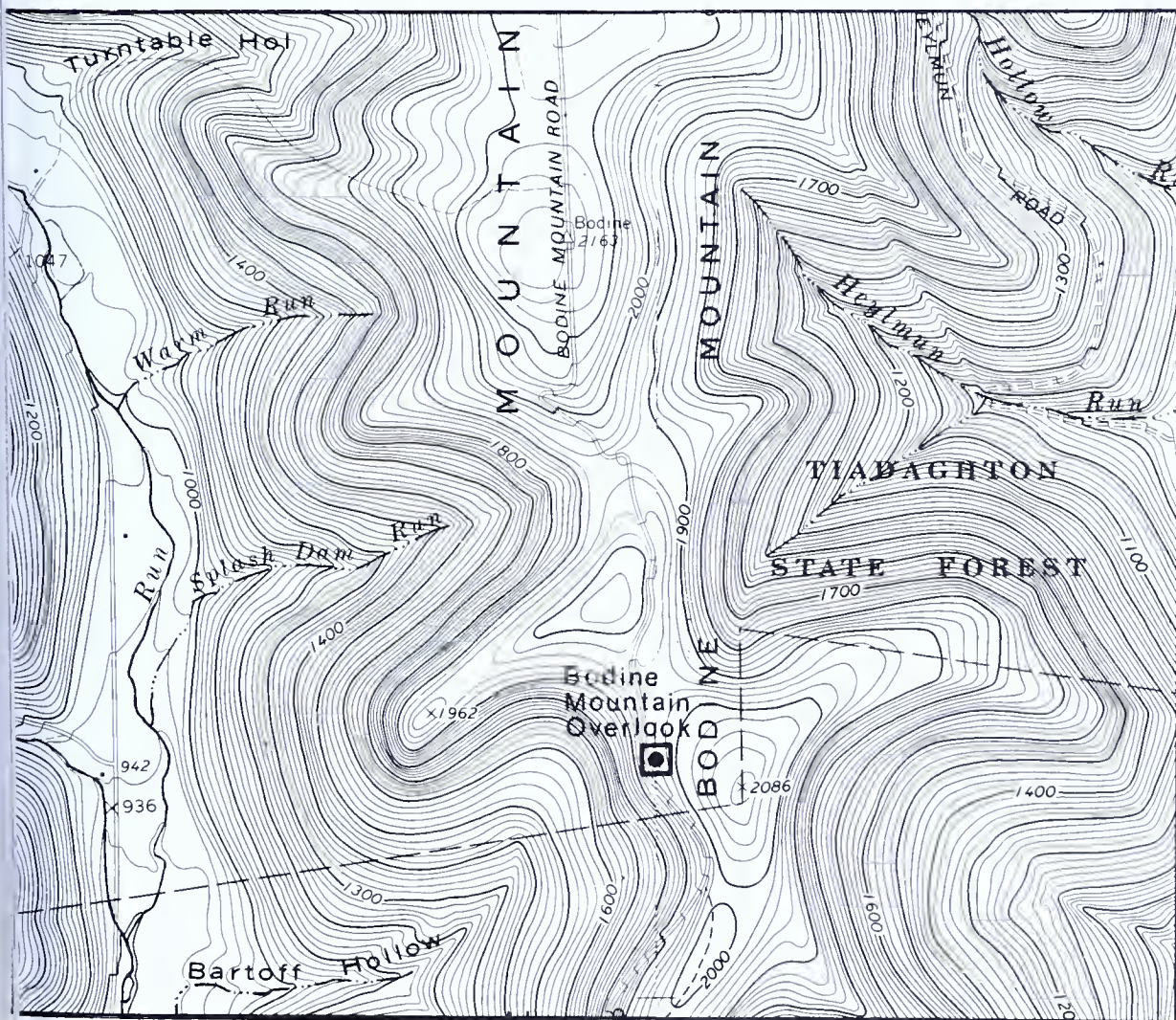
COUNTY: Lycoming

TOWNSHIP: McIntyre

QUADRANGLE: Trout Run

LOCATION: Within Tiadaghton State Forest along Bodine Mountain; 6.3 miles northeast of Trout Run along Bodine Mountain Road.

REMARKS: The hard, weather-resistant Burgoon Sandstone (Mississippian age) caps the rim and ridge top. The view of the adjacent gorge, tributary valleys, and High Plateau topography is excellent.



47. CANYON VISTA

COUNTY: Sullivan

TOWNSHIP: Forks

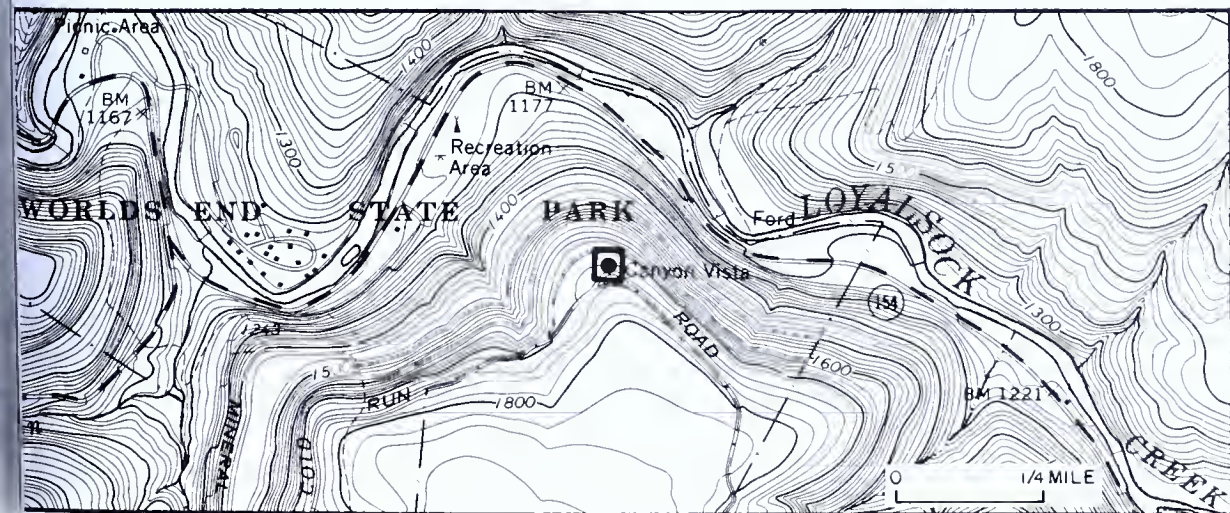
QUADRANGLE: Eagles Mere

LOCATION: Along Cold Run Road in Worlds End State Park, about 2 miles southeast of Forksville. Canyon Vista is on the south rim of Loyalsock Creek Canyon.

REMARKS: An excellent view of an outstandingly scenic gorge in the High Plateau; one of the most wildly beautiful and remote sights in Pennsylvania. Small waterfalls in tributaries to Loyalsock Creek are common. Resistant conglomerates of the Pottsville Group (Pennsylvanian age) cap the plateau at this site.



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



48. DEVILS DEN

COUNTY: McKean

TOWNSHIP: Keating

QUADRANGLE: Smethport

LOCATION: One and one-tenth miles south of the Borough of Smethport and U. S. Route 6.

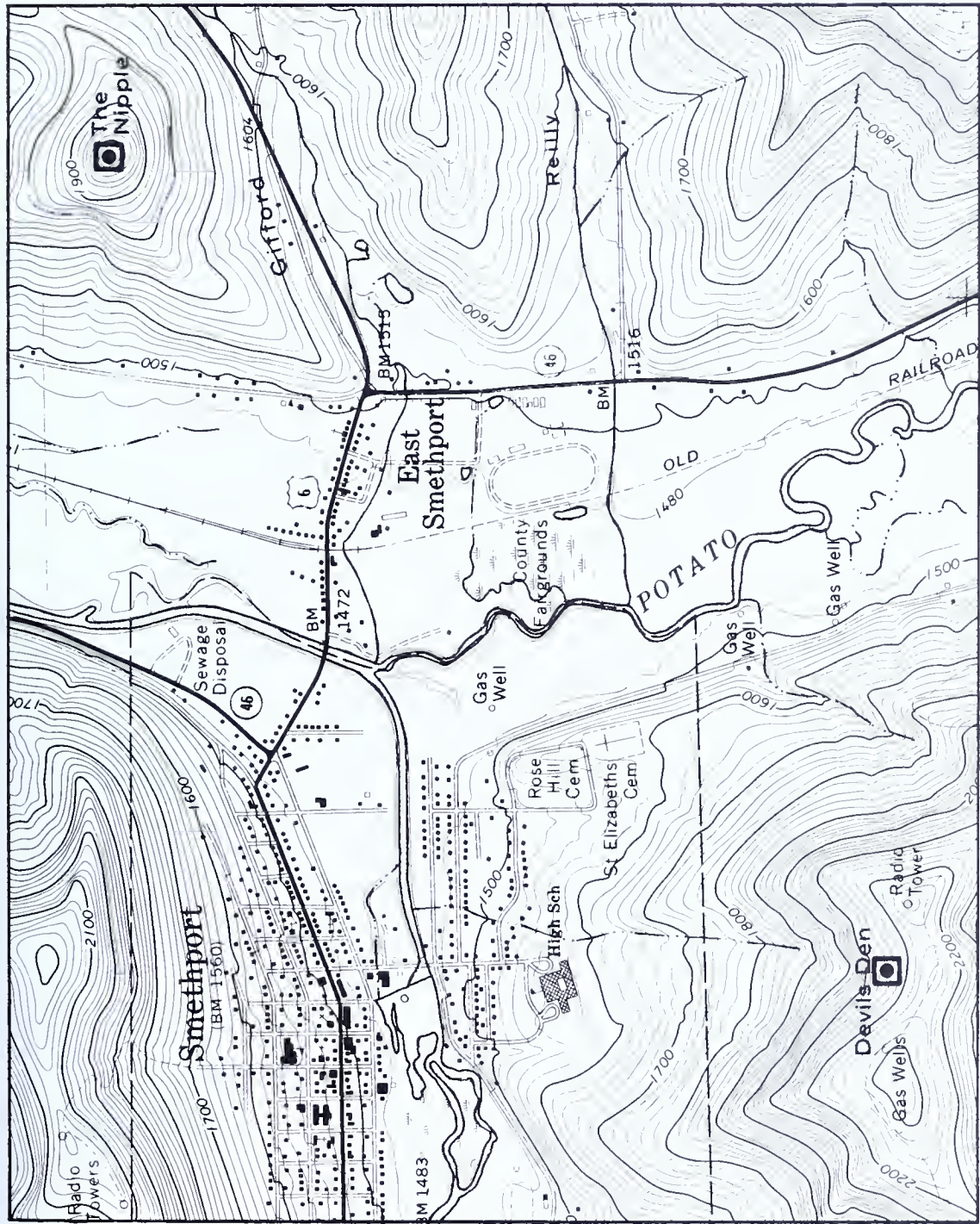
REMARKS: Devils Den is a series of rock outcrops of sandstone (Shenango Formation(?), Mississippian age) that form several "rock caves" and passageways.

The Nipple (49), about 2.3 miles to the northeast, is capped by a weather-resistant sandstone in the upper part of the Catskill Formation (Devonian age). This small, round, slender erosional feature rises above the surrounding countryside in a spectacular fashion.



THE NIPPLE

APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



50. DEVILS ELBOW

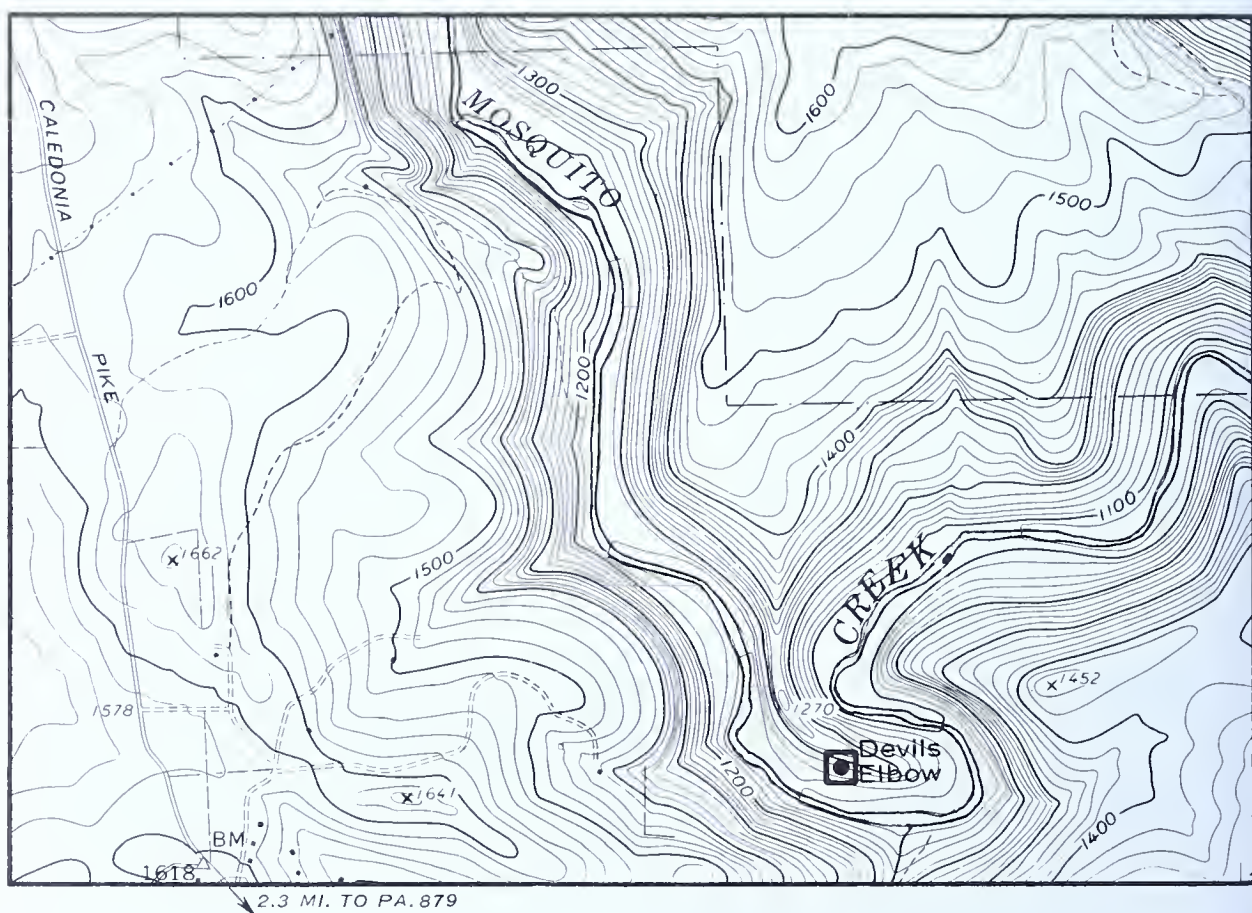
COUNTY: Clearfield

TOWNSHIP: Covington

QUADRANGLE: Devils Elbow

LOCATION: Along Mosquito Creek, 2.3 miles north of Pa. Route 879 at Frenchville.

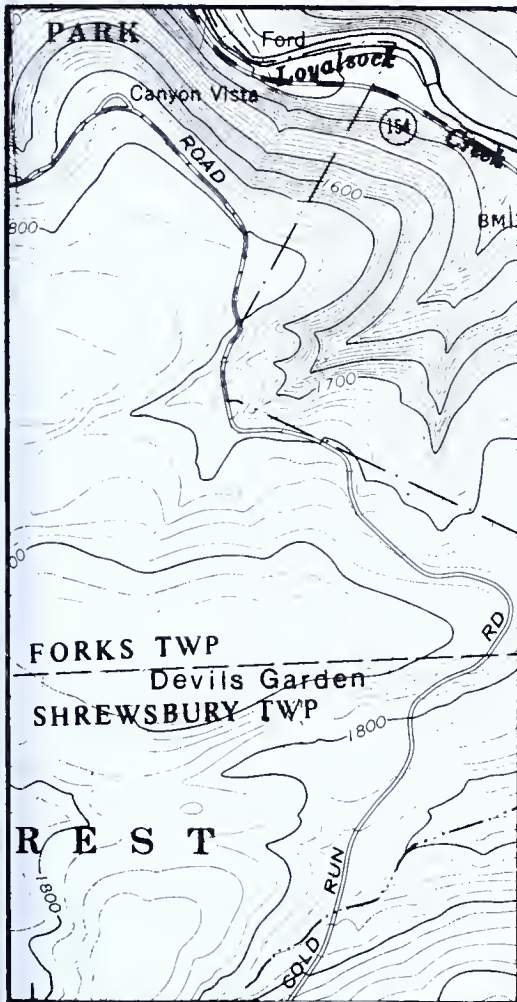
REMARKS: A unique meander of Mosquito Creek resembles a bizarre human elbow.



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



51. DEVILS GARDEN



COUNTY: Sullivan

TOWNSHIP: Shrewsbury

QUADRANGLE: Eagles Mere

LOCATION: One mile southeast of Canyon Vista (Worlds End State Park) in the Wyoming State Forest, adjacent to Cold Run Road.

REMARKS: Rock cliffs, ledges, and boulders of sandstone and siltstone of the Mauch Chunk Formation (Mississippian age). Crevices and narrow passages between the outcrops are similar to the **Labyrinth** (77) at Canyon Vista. Examples of flaggy-bedded and crossbedded siltstone and sandstone are magnificent.



52. DRY RUN GORGE

COUNTY: Sullivan

TOWNSHIP: Hillsgrove

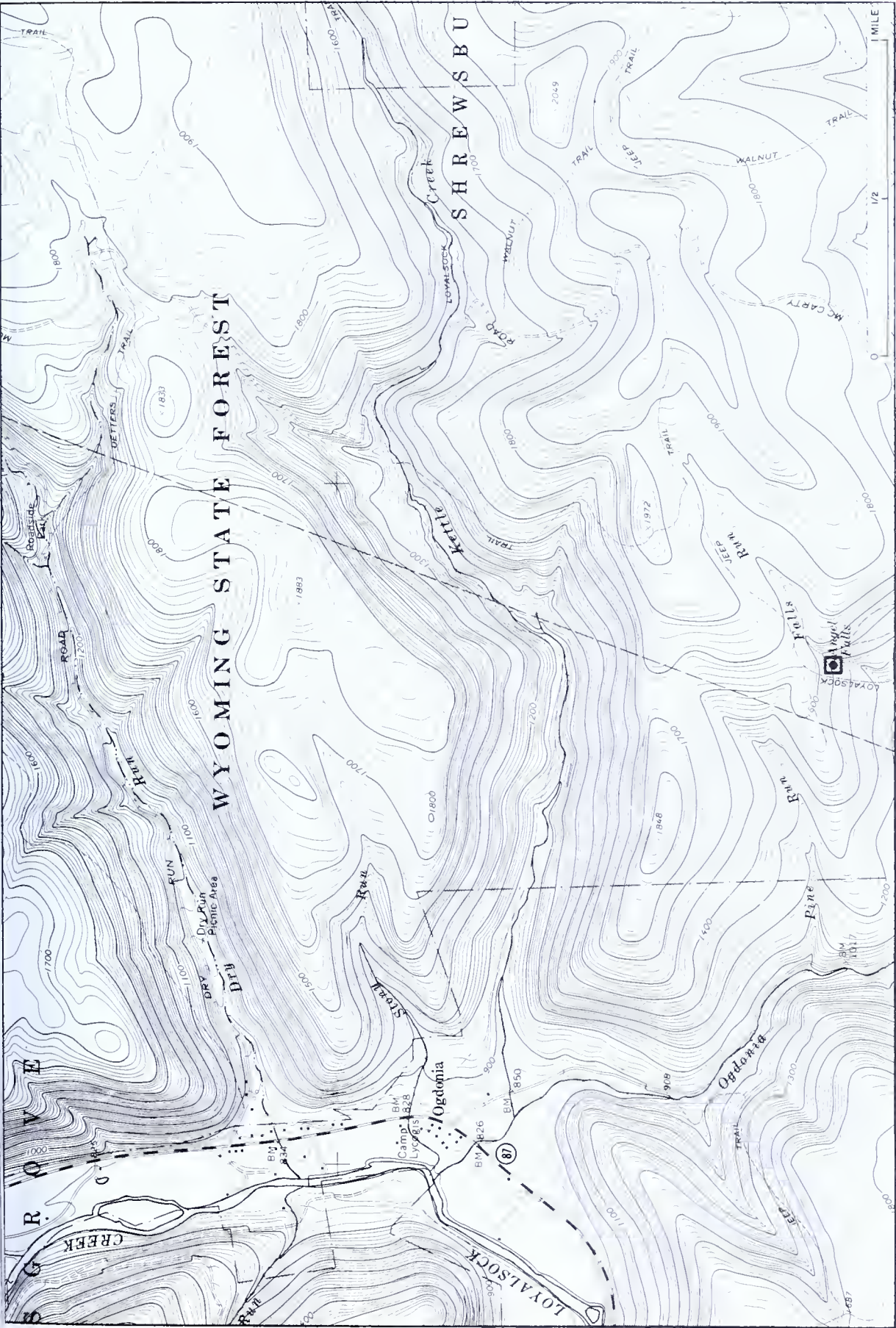
QUADRANGLE: Hillsgrove

LOCATION: Approximately 0.6 mile north of Ogdonia and 1.7 miles south of Hillsgrove on Pa. Route 87.

REMARKS: Waterfalls, remoteness, wild, highly scenic—all characterize this gorge and **Kettle Creek Gorge** (53) immediately to the south. **Angel Falls** (54) (Shrewsbury Township) in the Kettle Creek area is the outstanding falls of the region. Both Dry Run and Kettle Creek are tributaries to Loyalsock Creek and, with other tributaries, combine to form the very large **Loyalsock Creek Gorge** (55).



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



56. GARDNERS ROCKS (NORTH ROCKS)

COUNTY: Warren

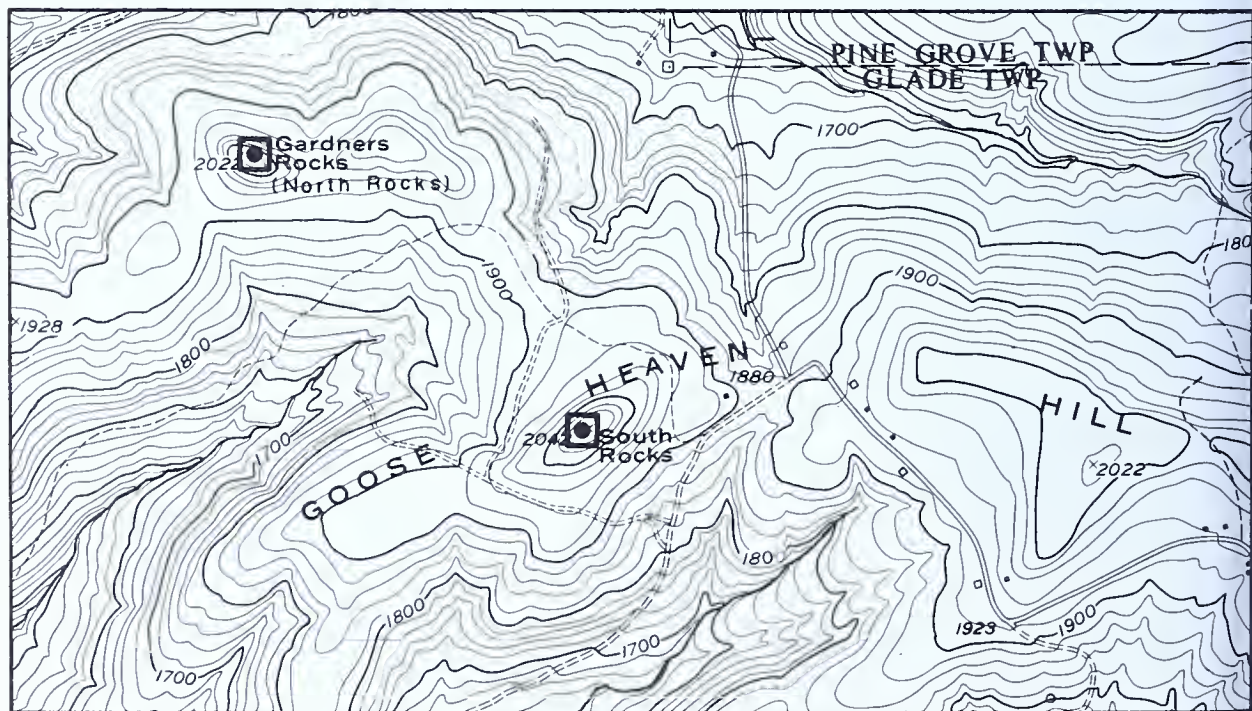
TOWNSHIP: Glade

QUADRANGLE: Scandia

LOCATION: Two and one-half miles northwest of "The Pass"; about 6.5 miles northeast of Warren and U. S. Route 6.

REMARKS: A solid ledge of conglomerate of the Olean Formation (Pottsville Group, Pennsylvanian age) about 51 feet thick. The outcrop is a typical flat-pebble conglomerate that is also known as **North Rocks**. **South Rocks** (57), a similar geologic feature, is located about 3/4 mile to the southeast.

REFERENCE: Carll, J. F. (1883), *Geological report on Warren County and the neighboring oil regions*, Pennsylvania Geological Survey, 2nd ser., Report 14, p. 187.



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



58. HAYSTACKS

COUNTY: Sullivan

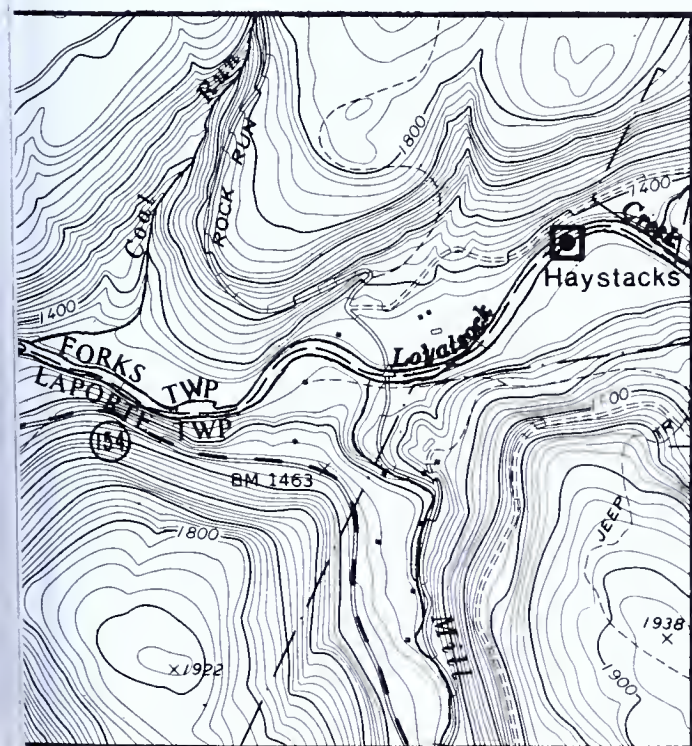
TOWNSHIPS: LaPorte and Forks

QUADRANGLE: Eagles Mere

LOCATION: In the streambed of Loyalsock Creek in Wyoming State Forest, about 0.4 mile east of the steel bridge over Loyalsock Creek where Mill Creek enters.

REMARKS: Large "haystack-like" outcrops protrude from the streambed, forming a highly scenic and unusual geologic site in a wild river gorge. The Burgoon Sandstone (Mississippian age) underlies the river for only a short distance at this site and, being a highly resistant, hard rock, has weathered slowly to the unusual forms seen here.

Above and below this site the riverbed is underlain by softer, more easily and faster eroded siltstones, sandstones, and shales (Mississippian-Devonian Burgoon-Cat-skill Formation transition zone).



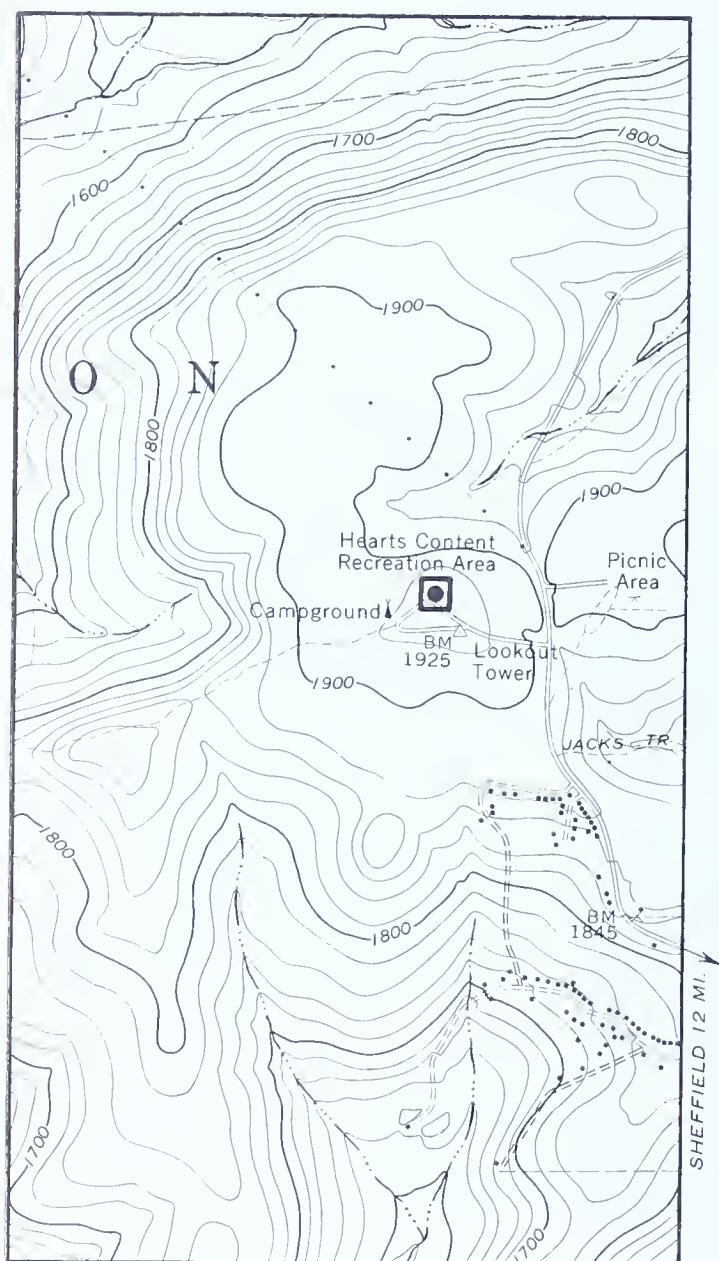
59. HEARTS CONTENT SCENIC AREA

COUNTY: Warren

TOWNSHIP: Watson

QUADRANGLE: Cobham

LOCATION: Approximately 14 miles southwest of the city of Warren; 4.6 miles southeast of the village of Cobham; within the Allegheny National Forest.



REMARKS: This site, at elevation 1925 feet, is one of the highest points in the county; a view of High Plateau topography may be seen from the tower. **Sandstone Springs** (60) is nearby on Pa Route 337. Hearts Content Scenic Area is a registered National Natural Landmark.

NOTES:

APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION

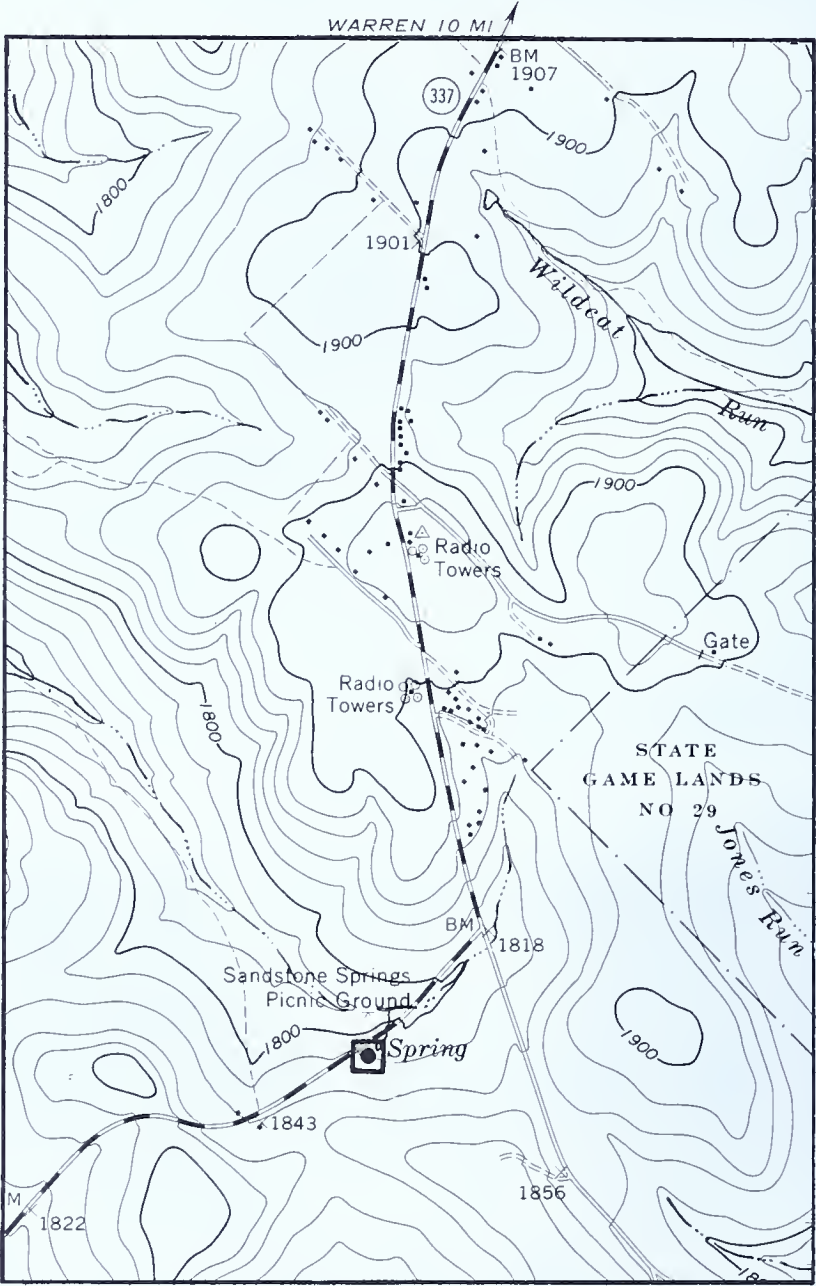


SANDSTONE SPRINGS



LOOKOUT TOWER

59. HEARTS CONTENT SCENIC AREA (continued)





61. HIGH KNOB OVERLOOK

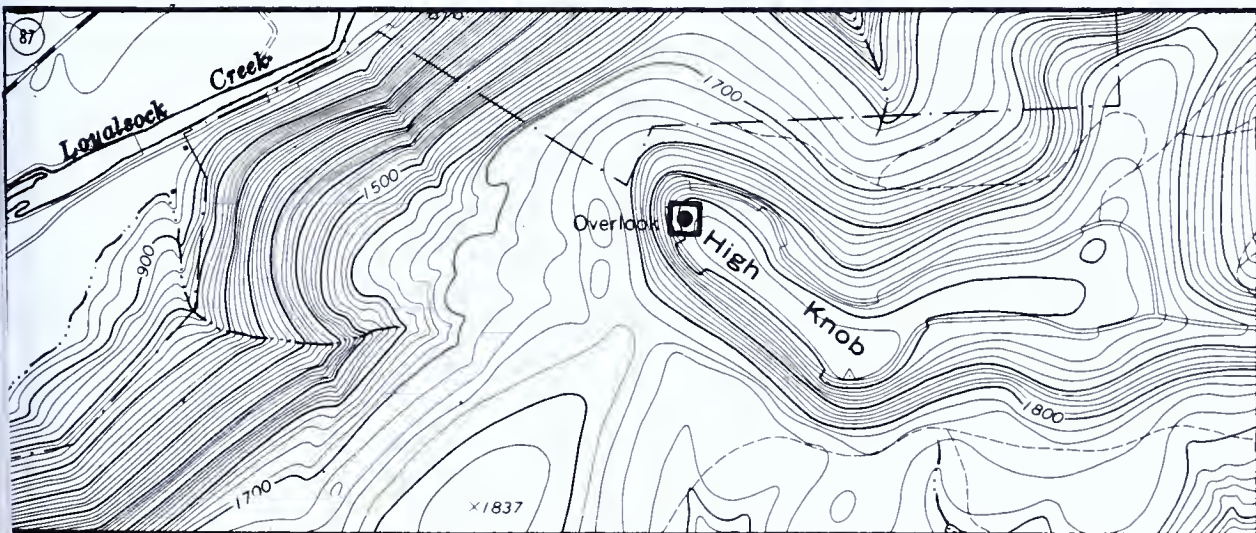
COUNTY: Sullivan

TOWNSHIP: Hillsgrove

QUADRANGLE: Hillsgrove

LOCATION: One and one-half miles east of the village of Hillsgrove in Wyoming State Forest; 4 miles west of Worlds End State Park.

REMARKS: The site provides an outstanding vista of the High Plateau; the view extends over seven counties, and is one of the most beautiful and breathtaking in the eastern United States. Conglomerate of the Pottsville Group (Pennsylvanian age) underlies the highest elevation of the knob, whereas the Loyalhanna Limestone and sandstone of the Mauch Chunk Formation (Mississippian age) underlie the rim and overlook.



62. HOAGLAND VISTA

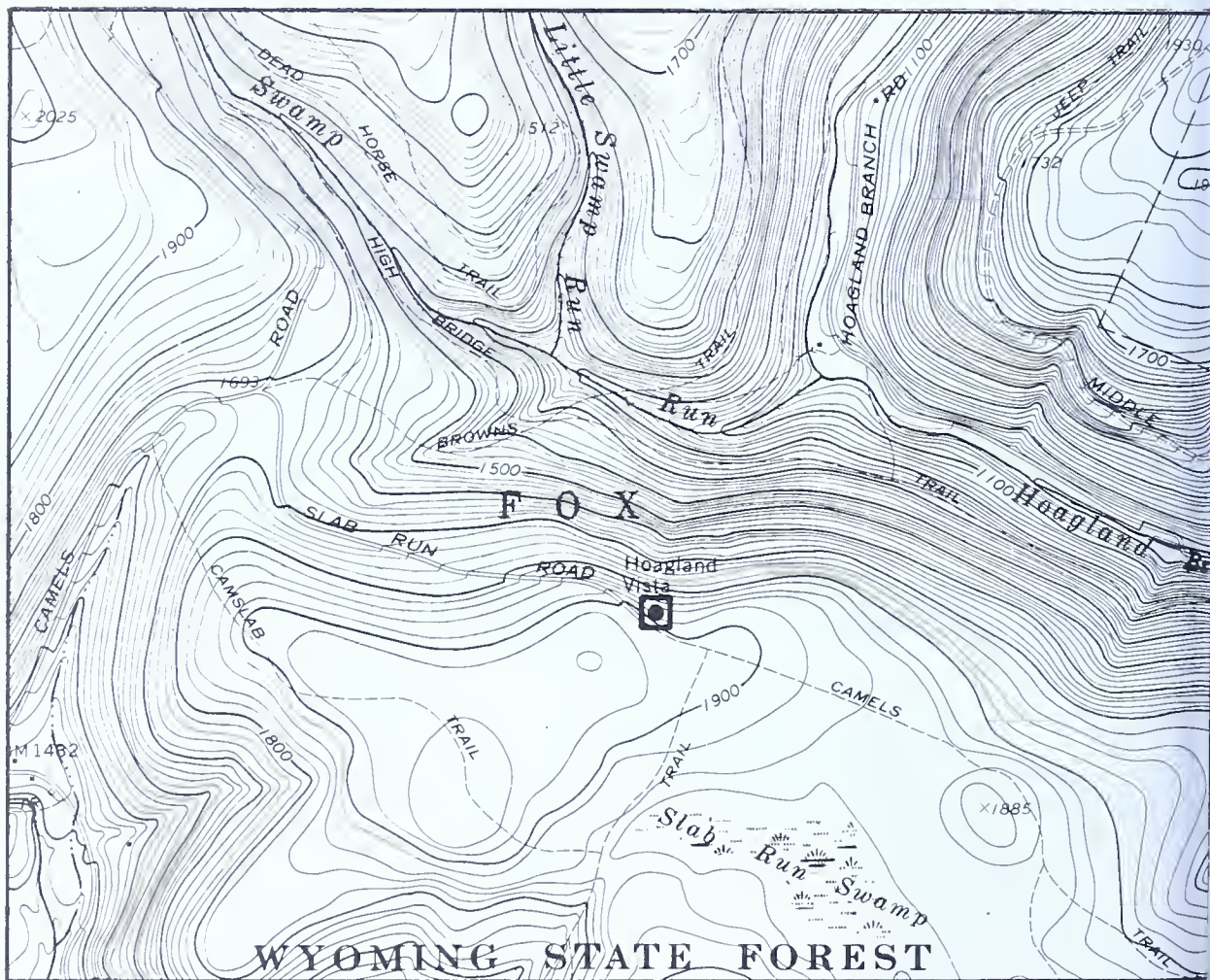
COUNTY: Sullivan

TOWNSHIP: Fox

QUADRANGLE: Hillsgrove

LOCATION: Approximately 3 miles north of Hillsgrove, at the terminus of Slab Run Road in Wyoming State Forest.

REMARKS: A magnificently scenic overlook of a gorge in the "High Plateau Country."



APPALACHIAN PLATEAUS PROVINCE

ALLEGHENY HIGH PLATEAUS SECTION



63. HYNER VIEW

COUNTY: Clinton

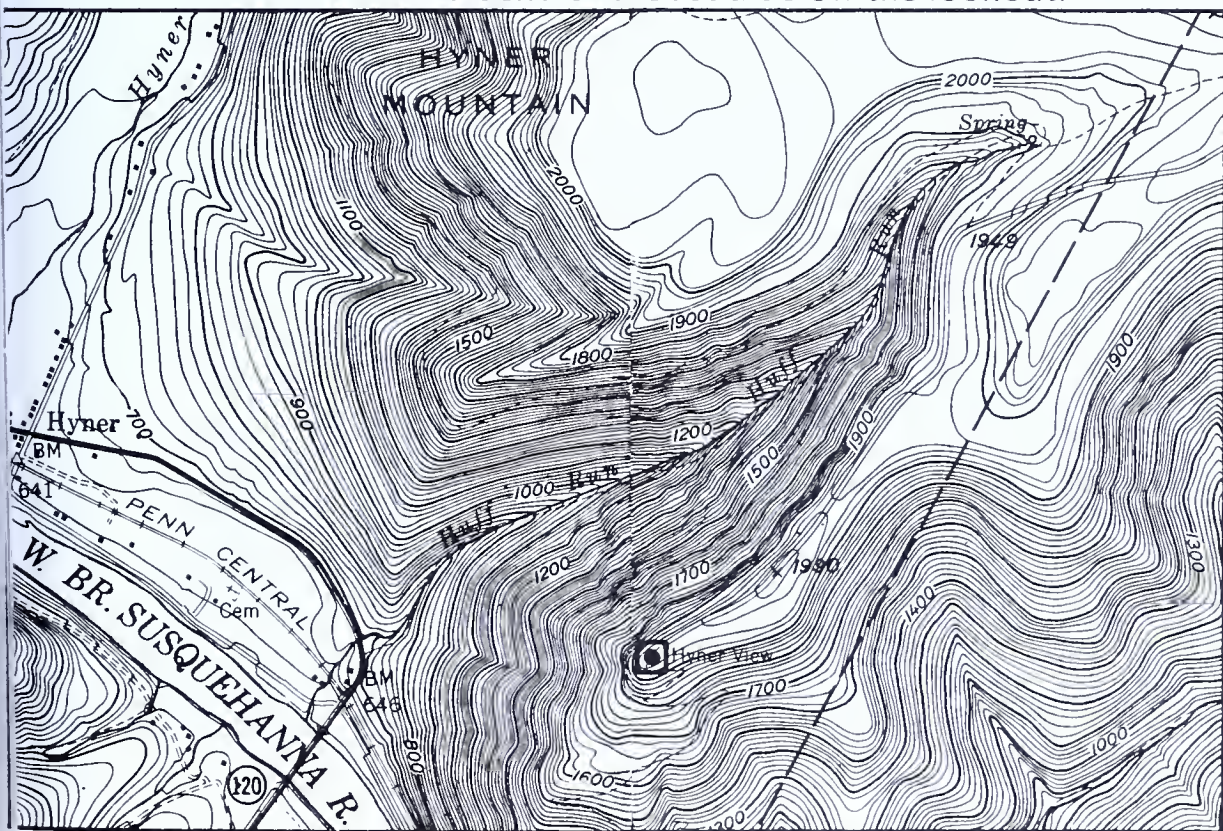
TOWNSHIP: Chapman

QUADRANGLES: Glen Union and Renovo East

LOCATION: Approximately 6.5 miles east of Renovo and 1.1 miles southeast of the village of Hyner on Pa. Route 120; part of Hyner Run State Park.

REMARKS: A spectacular scenic lookout on Hyner Mountain; the scene is an overview of the West Branch of the Susquehanna River and the Allegheny High Plateau. This lookout is perched on a cliff edge more than 1300 feet above the Susquehanna River. Hyner View is ranked as one of the most outstanding scenic views in the United States.

Excellent exposures of sandstone, shale, and conglomerate of the Catskill Formation (Devonian age) are seen along the road winding from the Hyner Run State Park office to the lookout; an unusual Catskill "breccia" bed is exposed at the second bend of the road below the lookout.



63. **HYNER VIEW** *(continued)*



Photograph by Grant Holliman



64. ICE MINE

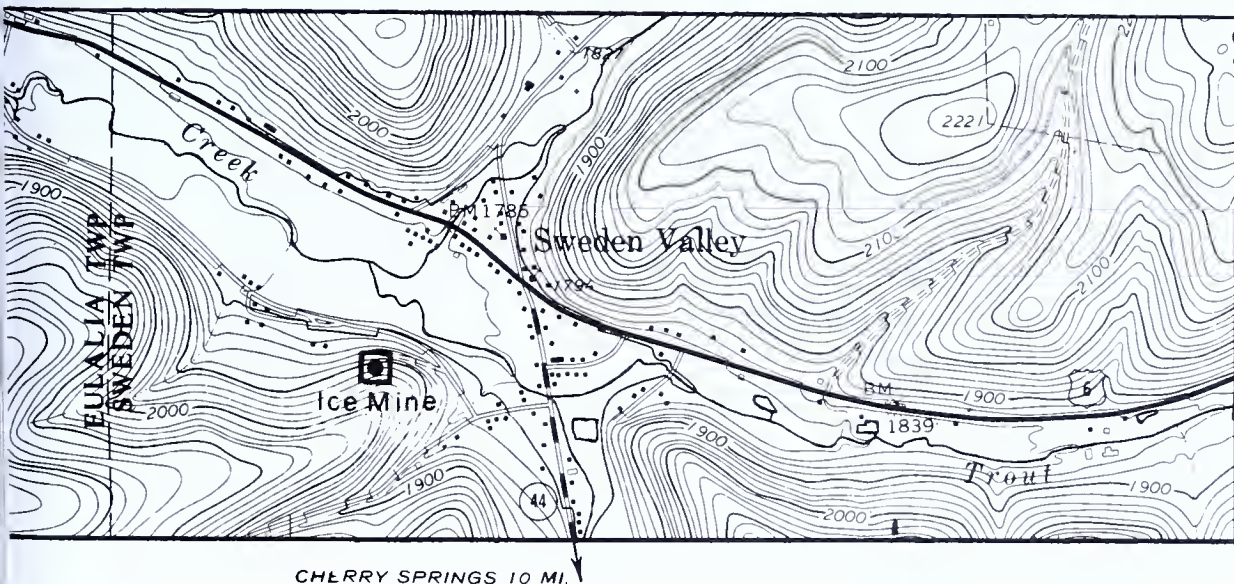
COUNTY: Potter

TOWNSHIP: Sweden

QUADRANGLE: Sweden Valley

LOCATION: Approximately 4 miles east of the square in Coudersport, in the village of Sweden Valley; 1500 feet southwest of the junction of U. S. Route 6 and Pa. Route 44.

REMARKS: A vertical shaft or opening about 40 feet deep, about 8 feet wide, and 10 feet long. Ice formations appear in the shaft during the spring of the year, continue through the hot weather, and disappear in winter. Ice appears in various shapes and forms, often as huge icicles measuring from 1 to 3 feet in thickness, and from 15 to 25 feet in length; the ice is generally clear and sparkling. The origin may be thus: during the winter, cold air over the hilltop sinks into rock openings in the Lock Haven Formation (Devonian age) and slowly expels the warm air that had penetrated these openings during the preceding summer. Ordinarily this process takes place locally, but here the interconnection of the rock crevices tends to be so arranged that the air circulation over a wide region is focused on one spot. Thus, from April or May to September, cold air comes in contact with



64. ICE MINE (*continued*)

percolating groundwater, forming ice during the hot months of the year; from September to late spring, warm air, trapped in the rocks from the preceding summer, escapes and melts the ice.

REFERENCE:

Shear, Thomas (no date), *The wonderful ice mine—History and description of the Coudersport Ice Mine, The Coudersport Ice Mine, Coudersport, Pennsylvania*, 25 p.



NOTES:

APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



65. JAKES ROCKS

COUNTY: Warren

TOWNSHIP: Mead

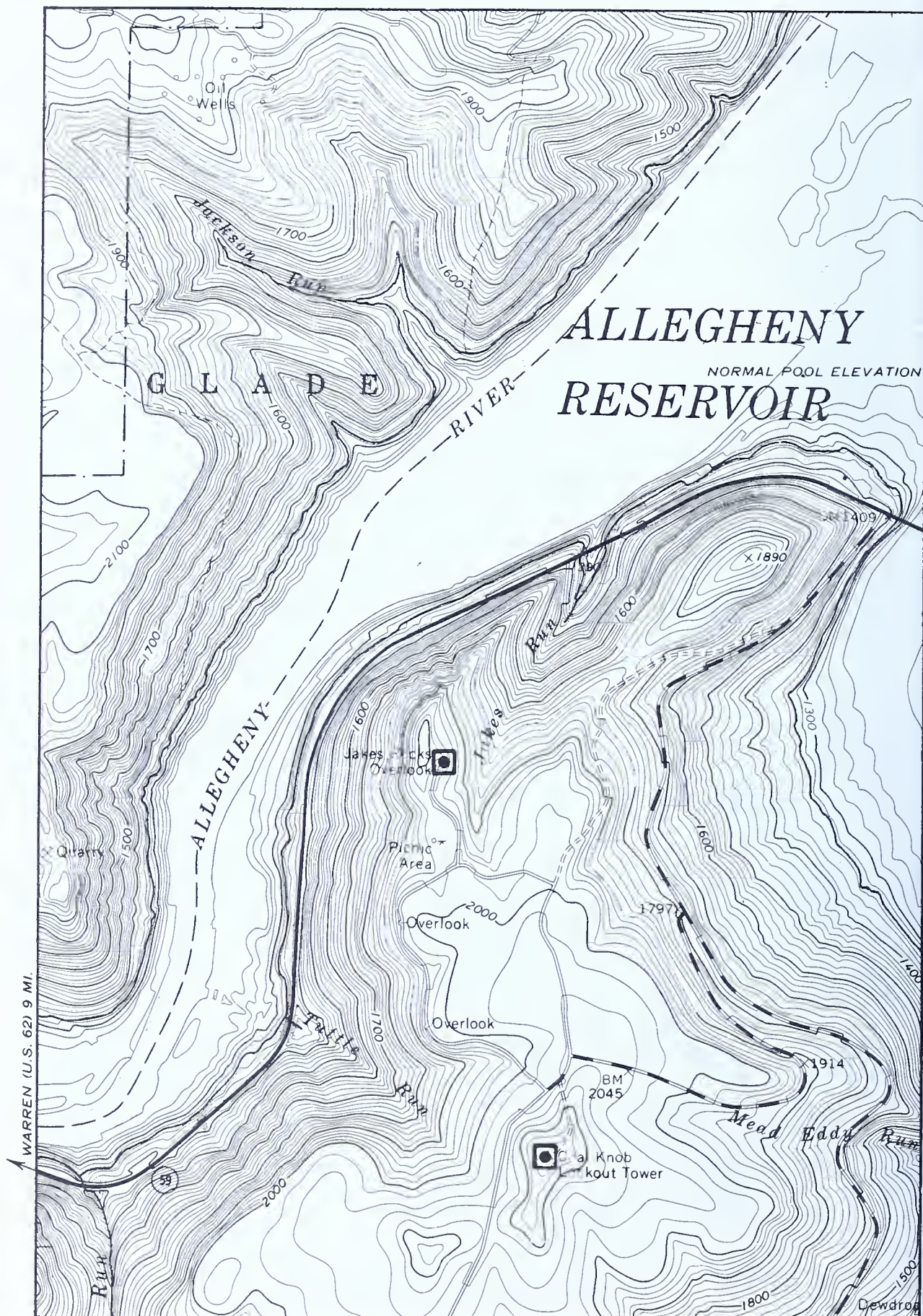
QUADRANGLE: Cornplanter Bridge

LOCATION: One and one-third miles southwest of Cornplanter Bridge on the east rim of the Allegheny River arm of the Allegheny Reservoir; within the Allegheny National Forest.

REMARKS: An area of rugged natural beauty overlooking the Allegheny Reservoir and Kinzua Dam; approximately 600 feet above water level; affords a spectacular view; composed of huge blocks and cliff of conglomerate of the Olean Formation (Pottsville Group, Pennsylvanian age). Jakes Rocks comprises three separate sites: **North Rock** (66), **South Rock** (67), and **Picnic Rock** (68). **Coal Knob** (69) to the south and several "overlooks" between are capped by this conglomerate.



65. JAKES ROCKS (continued)



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



70. KINZUA GORGE

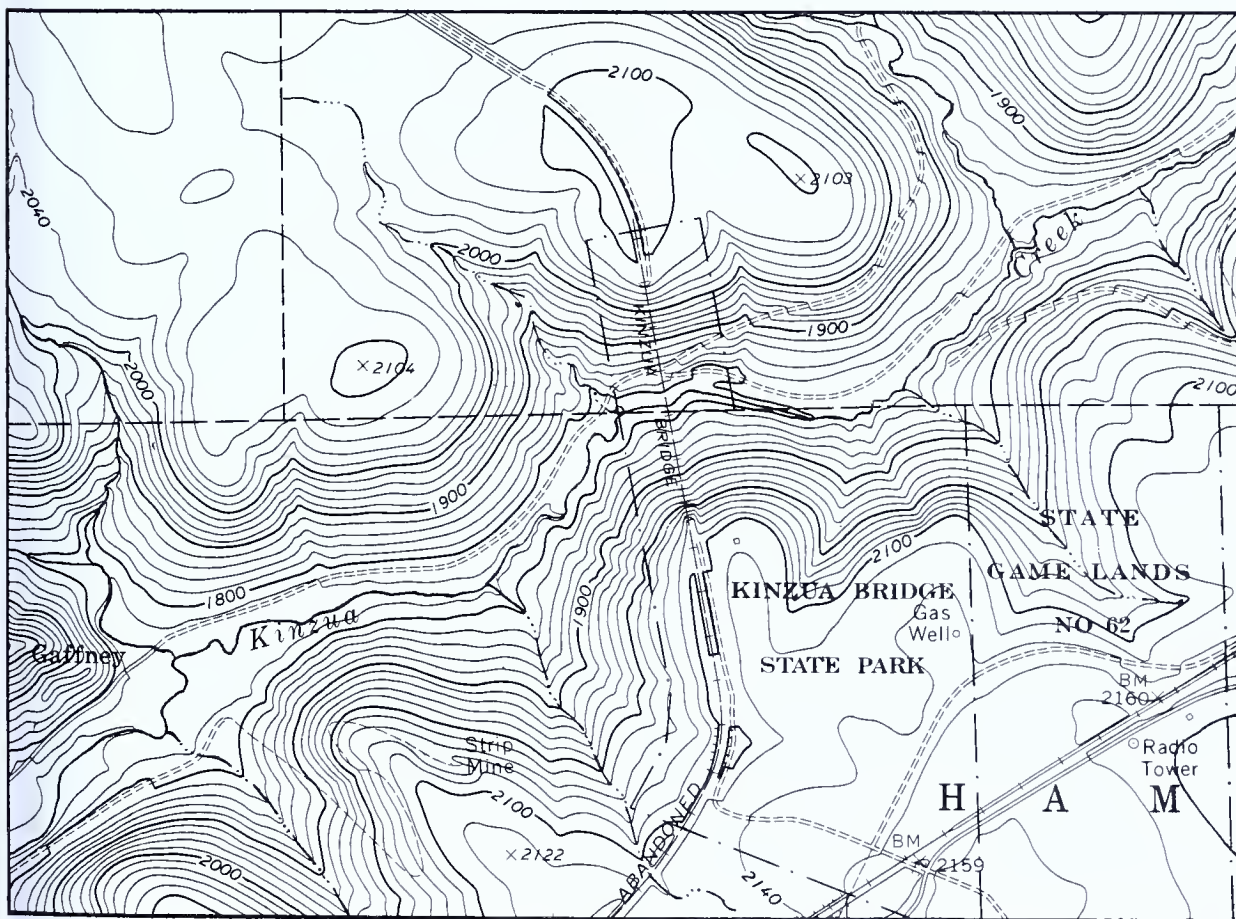
COUNTY: McKean

TOWNSHIP: Hamlin

QUADRANGLE: Cyclone

LOCATION: Approximately 8.2 miles southwest of Smethport;
within Kinzua Bridge State Park.

REMARKS: A spectacular gorge and scenic view of the High Plateau; site of the famous Kinzua Viaduct, the second highest bridge of this type on the North American continent, 301 feet high and 2110 feet long. The steel structure was built in 1900 as a replacement for the original iron viaduct of the same dimensions constructed in 1882. The iron viaduct was the highest railroad bridge in the world at that time (1882). The Kinzua Viaduct is in the *National Register of Historic Places*.



70. KINZUA GORGE *(continued)*





71. KITCHEN CREEK GORGE

COUNTY: Luzerne

TOWNSHIP: Fairmount

QUADRANGLE: Red Rock

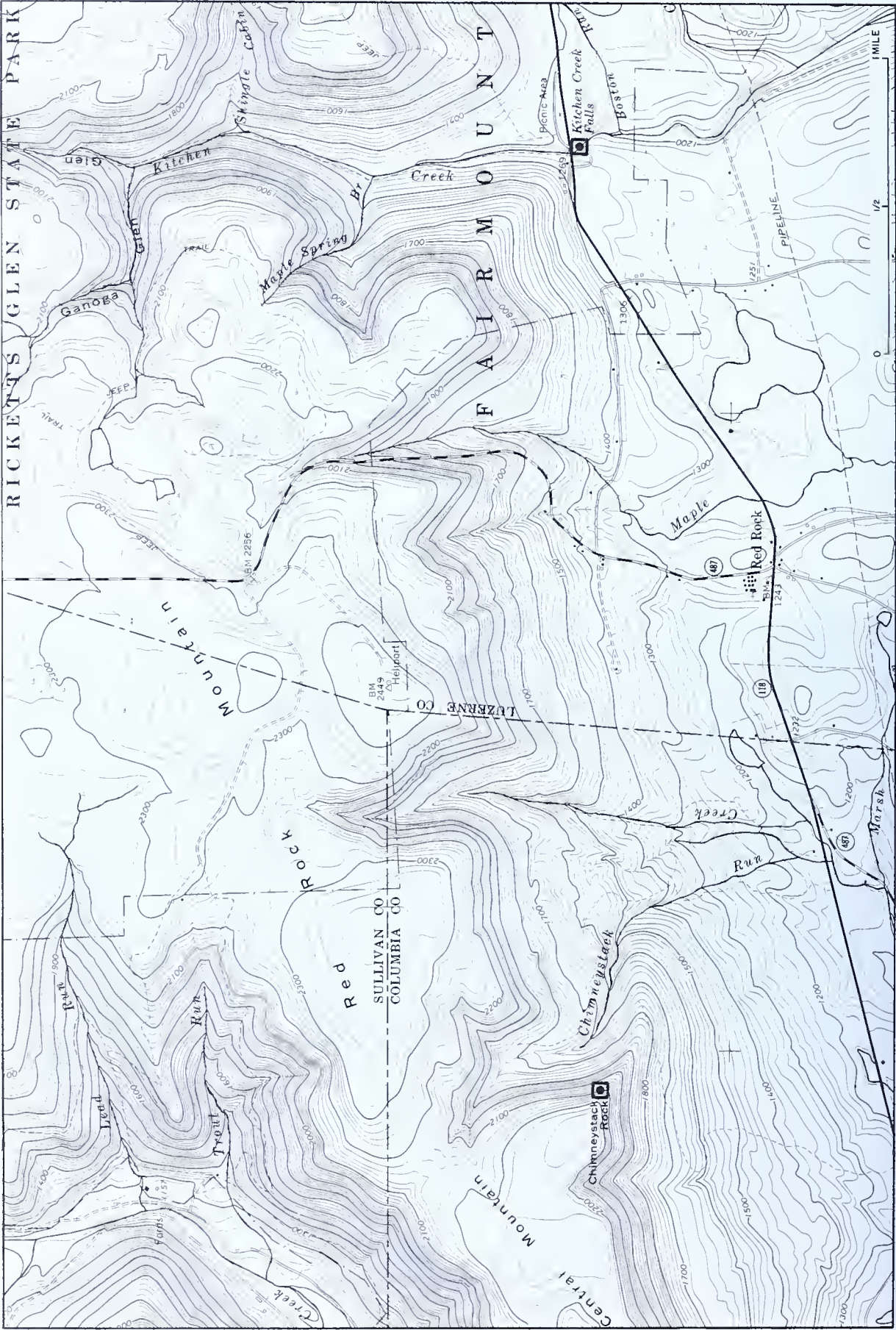
LOCATION: In Ricketts Glen State Park, at Red Rock, where Pa. Routes 118 and 487 intersect.

REMARKS: The Kitchen Creek Gorge crosses the Allegheny Front, where Kitchen Creek descends 1000 feet in about 3 miles over 25 waterfalls. **Kitchen Creek Falls** (72) (called **Adams Falls** on the trail) is the largest and most spectacular. This gorge is a National Natural Landmark.

The next gorge to the west, **Fishing Creek Gorge** (73) (Sullivan County), is equally picturesque; **Lewis Falls** (74) and **Twin Falls** (75) are found there. Nearby, **Chimneystack Rock** (76) (Columbia County) marks the rim of the Allegheny Front 3 miles west of Ricketts Glen State Park.



71. KITCHEN CREEK GORGE (continued)



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



77. LABYRINTH

COUNTY: Sullivan

TOWNSHIP: Forks

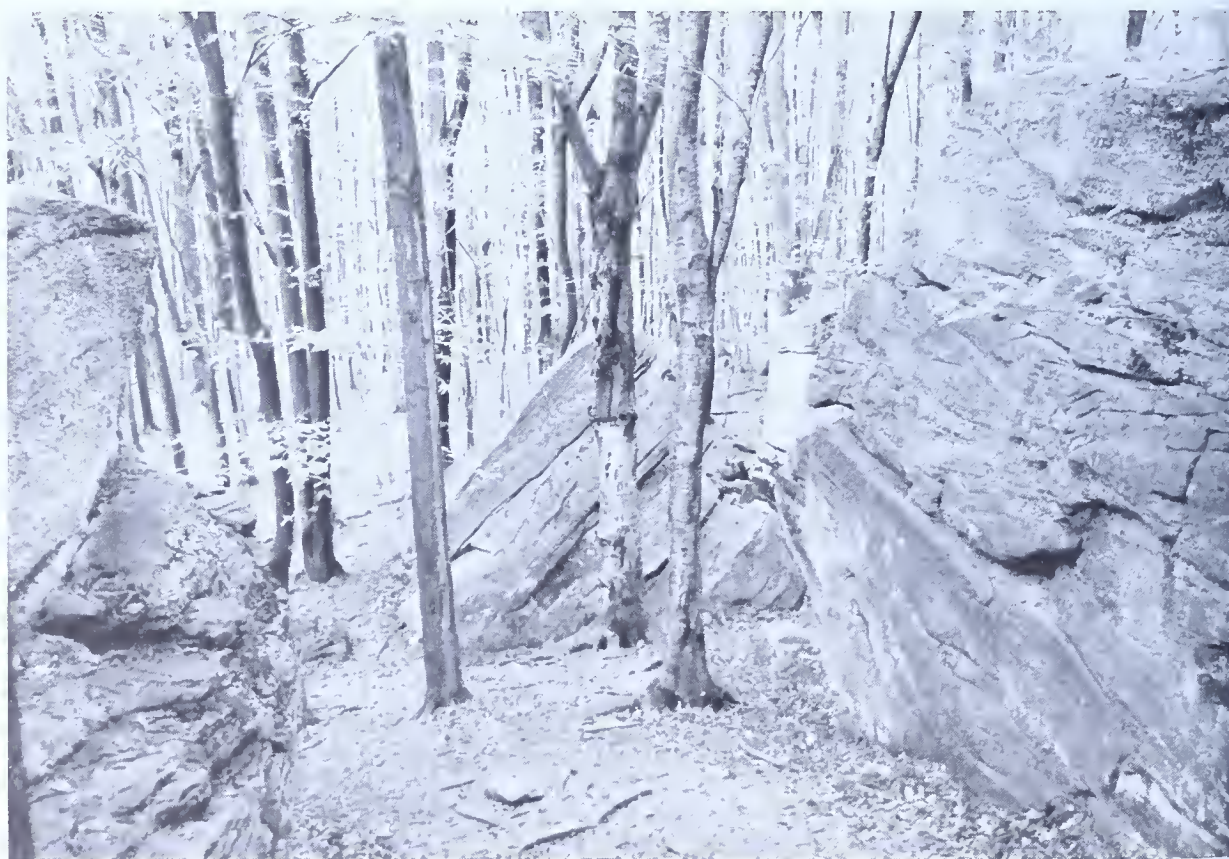
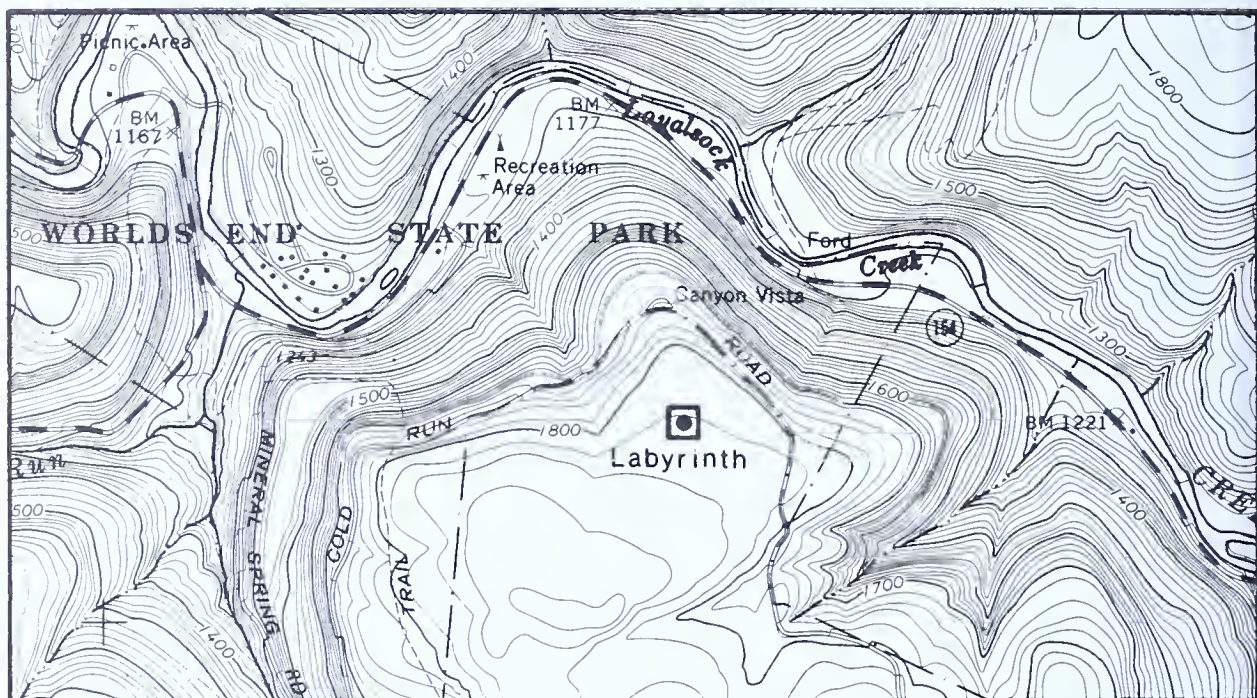
QUADRANGLE: Eagles Mere

LOCATION: On the crest of a broad knob in Wyoming State Forest, about 300 yards south of Canyon Vista on Cold Run Road in Worlds End State Park.

REMARKS: An area of large blocks of crossbedded Pottsville conglomerate (Pennsylvanian age), which have weathered along vertical fractures to form an intricate series of deep, narrow passageways. The fracture openings range from 1 to 3 feet wide, are between 10 and 20 feet deep, and generally intersect at right angles.



77. LABYRINTH (continued)



APPALACHIAN PLATEAUS PROVINCE

ALLEGHENY HIGH PLATEAUS SECTION



78. LAMBS HILL

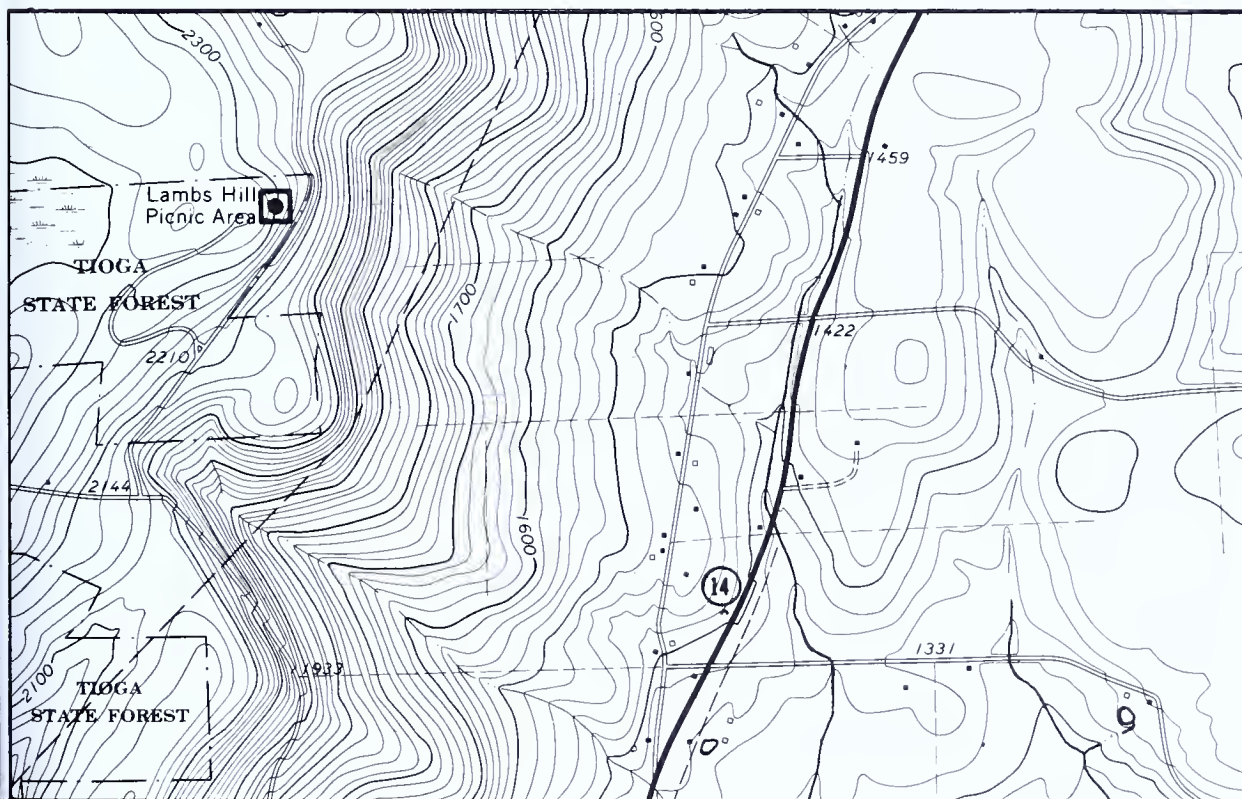
COUNTY: Bradford

TOWNSHIP: Armenia

QUADRANGLE: Canton

LOCATION: Two and two-tenths miles southwest of the Borough of Alba and Pa. Route 14; site of the Lambs Hill Picnic Area in Tioga State Forest.

REMARKS: An overlook provides a breathtaking scenic vista of both the Allegheny High Plateau topography and that of the adjacent Glaciated Low Plateau. Conglomerates of the Burgoon Sandstone (Mississippian age) underlie the rim and, due to their high resistance to weathering, account for the higher plateau at this site.



79. LINCOLN FALLS



COUNTY: Sullivan

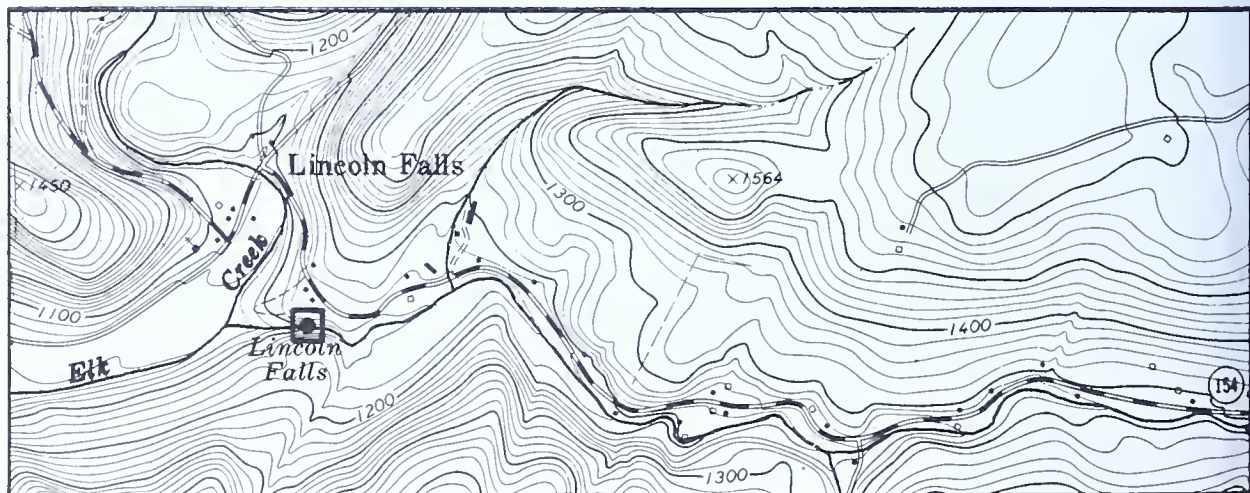
TOWNSHIP: Elkland

QUADRANGLE: Shunk

LOCATION: At the village of Lincoln Falls along Pa. Route 154; on Elk Creek.

REMARKS: The falls are extremely picturesque as the water plunges over flat-lying red sandstones of the Catskill Formation (Devonian age).

Buttermilk Falls (80) to the west in Fox Township, about 0.7 mile south of the village of Shunk on Pa. Route 154, is very similar.



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



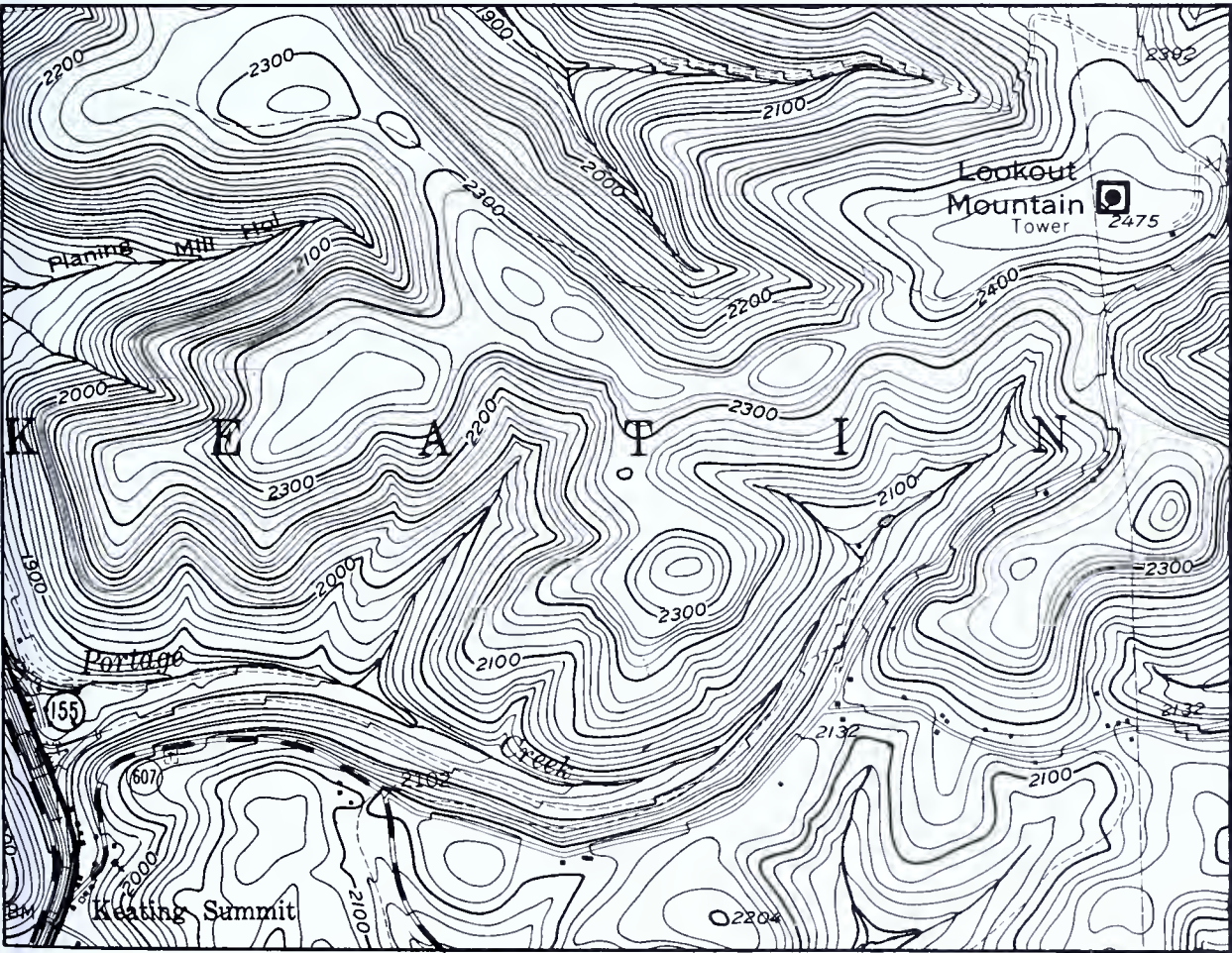
81. LOOKOUT MOUNTAIN

COUNTY: Potter TOWNSHIP: Keating

QUADRANGLE: Keating Summit

LOCATION: Approximately 2 miles northeast of the village of Keating Summit and the intersection of Pa. Routes 155 and 607.

REMARKS: This mountaintop provides a scenic view of the High Plateaus section. Four miles to the south, **Fox Mountain** (82) in Portage Township affords a similar view of the plateau.



**81. LOOKOUT
MOUNTAIN**
(continued)



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



83. MASON HILL

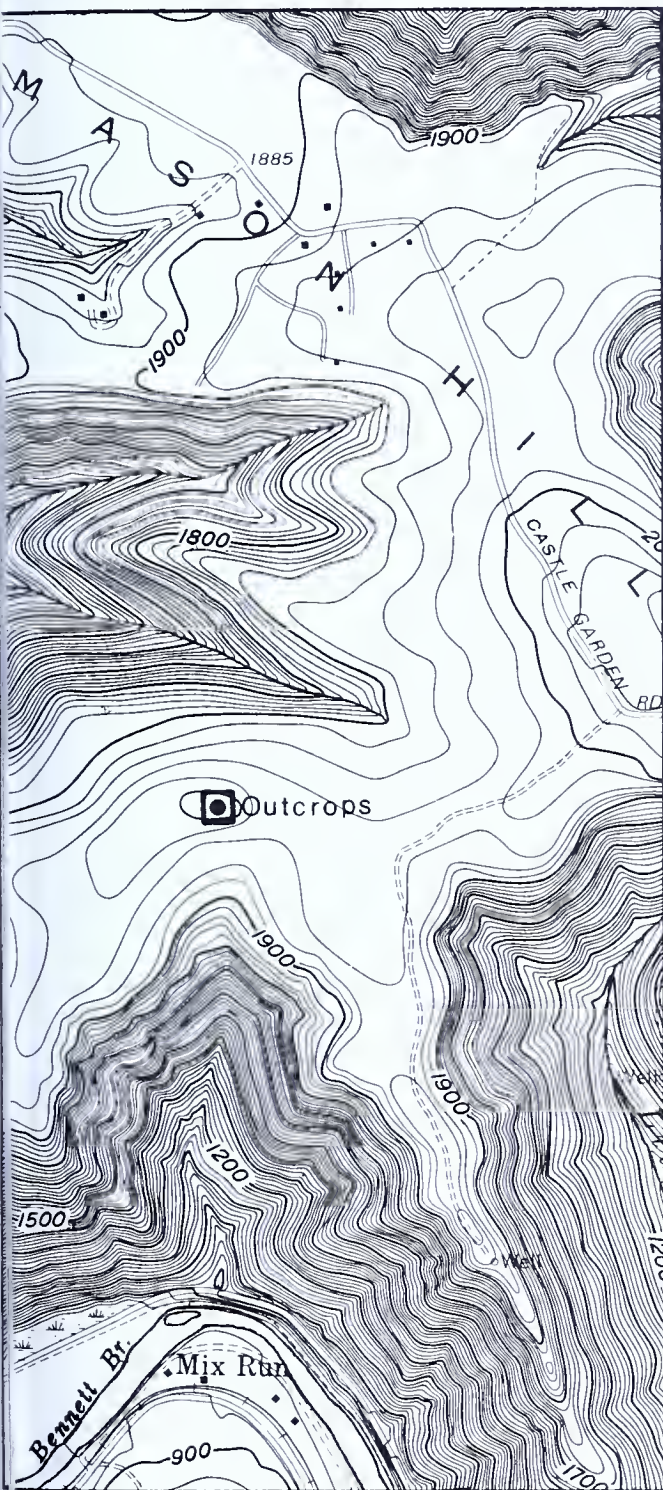
COUNTY: Cameron

TOWNSHIP: Gibson

QUADRANGLE: Driftwood

LOCATION: Eight tenths of a mile north of the village of Mix Run and 0.7 mile west of Castle Garden Road.

REMARKS: Massive sandstone outcrops of the Burgoon Sandstone (Mississippian age) have been deeply weathered; frost action has widened joint (fracture) openings.



84. PANTHER ROCKS

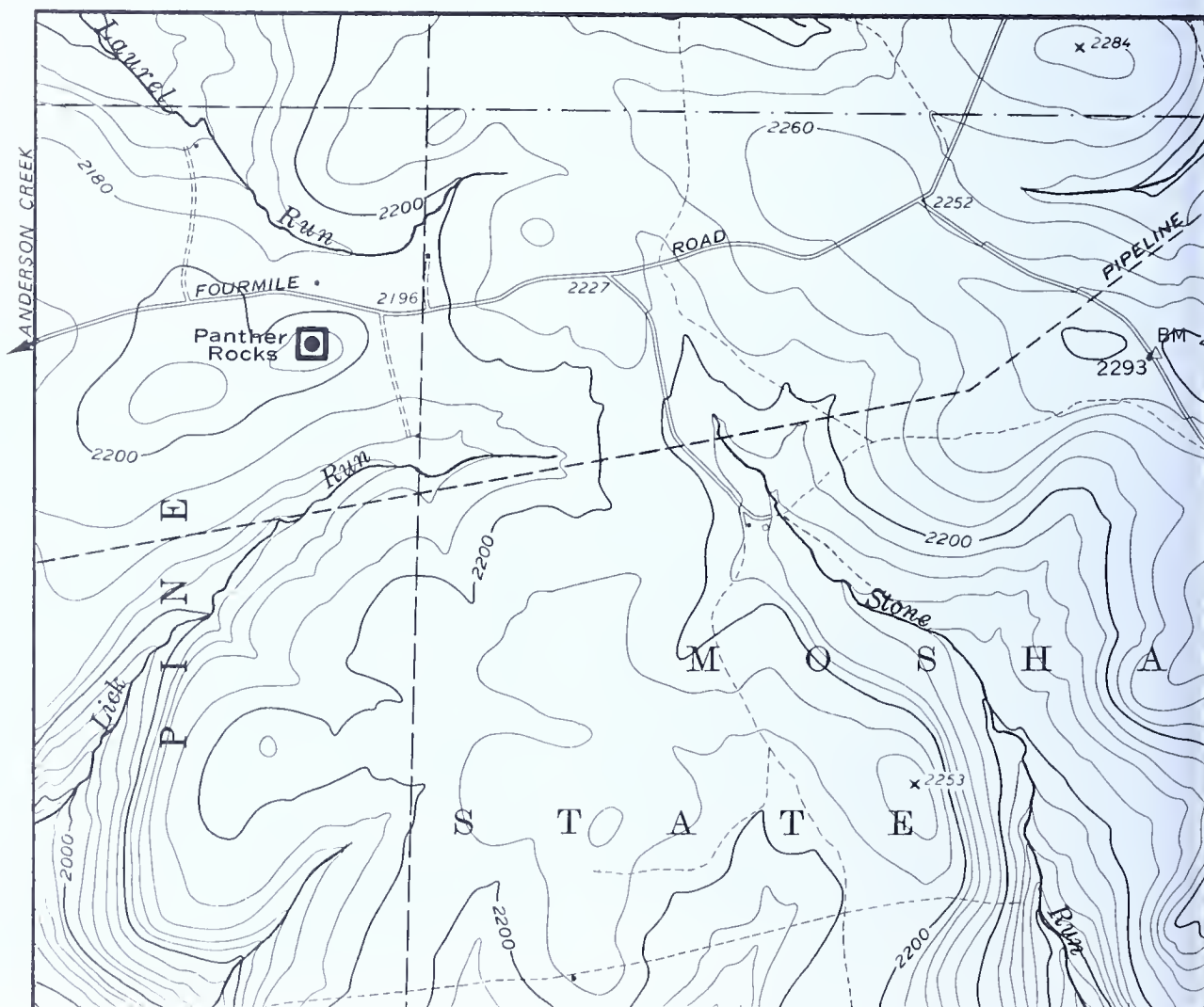
COUNTY: Clearfield

TOWNSHIP: Pine

QUADRANGLE: Huntley

LOCATION: Three miles east of the village of Anderson Creek, along Fourmile Road; within Moshannon State Forest.

REMARKS: A "rock city" in the Homewood Sandstone Member of the Curwensville Formation (Pottsville Group, Pennsylvanian age). "Streets" owe their origin to rock fractures that have been enlarged by weathering.



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



85. PICTURE ROCKS

COUNTY: Lycoming

TOWNSHIP: Penn

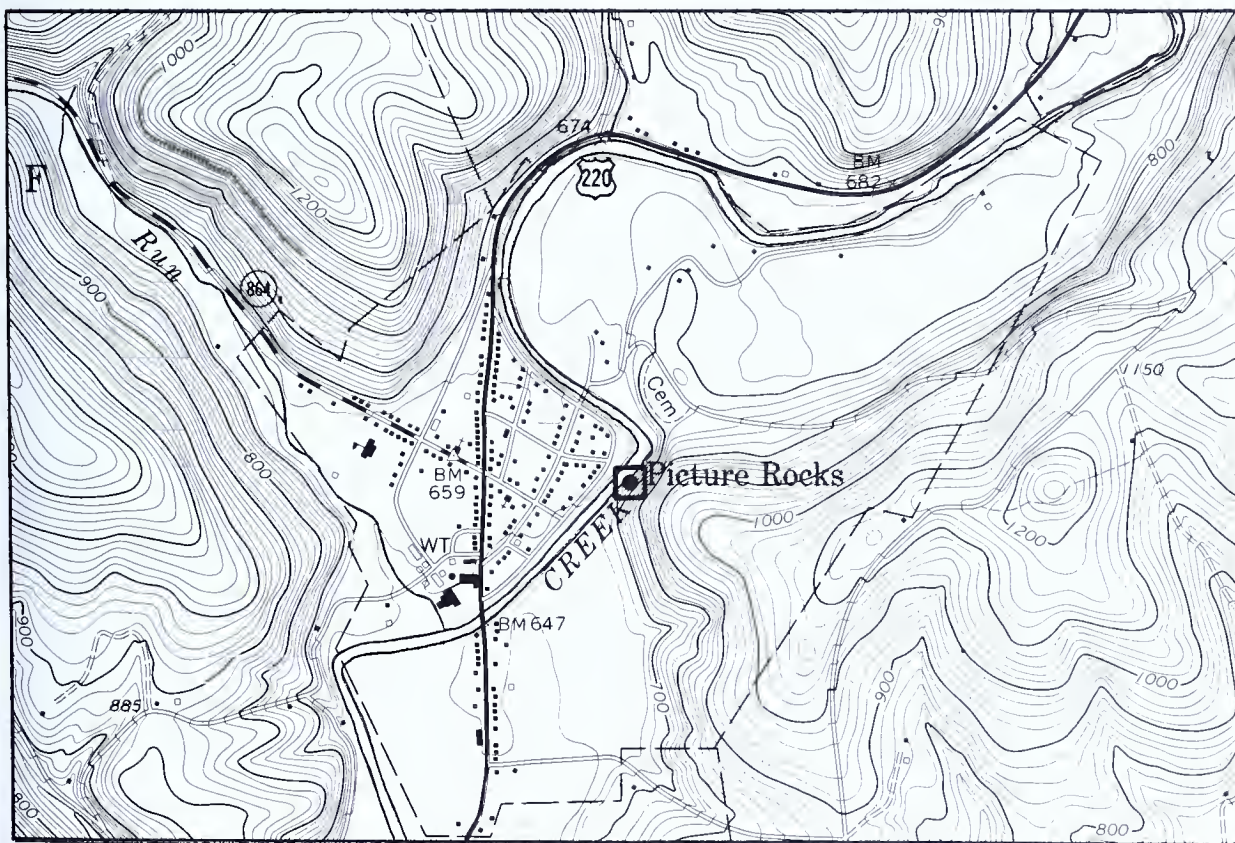
QUADRANGLE: Picture Rocks

LOCATION: In the village of Picture Rocks along U. S. Route 220, about 1 mile north of Hughesville.

REMARKS: A small village park has been built adjacent to a picturesque cliff exposure of siltstones and mudstones of the Lock Haven Formation (Late Devonian age) along Muncy Creek. The cliff was once the reported site of Indian paintings showing scenes of their life in these hills; all traces of the paintings have disappeared.



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



86. PINE CREEK GORGE

COUNTIES: Tioga and
Lycoming

TOWNSHIPS: Delmar, Shippen, Elk,
and Morris (Tioga
County); Brown and
McHenry (Lycoming
County)

QUADRANGLES: Tiadaghton, Cedar Run, Slate Run, Cammal, and
Jersey Mills

LOCATION: Extends for more than 25 miles between Ansonia
and Waterville along Pine Creek; also known as
the "Grand Canyon of Pennsylvania." Two state
parks, Colton Point and Leonard Harrison, are lo-
cated at the northern end of the gorge.

REMARKS: The maximum depth of the canyon is 1450 feet at
Waterville, near the southern end. At the state
parks the depth is more than 800 feet and the dis-
tance from rim to rim is approximately 4000 feet.
The gorge becomes deeper and wider south of the



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



park areas, but the park locations afford most of the spectacular scenic overlooks—**Barbour Rock** (87), **Harrison Lookout** (88), and **Colton Point** (89).

Near Bluestone, at the southern end of the gorge, **Lebo Vista** (90) is an outstanding scenic overlook.



86. PINE CREEK GORGE (continued)



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



Important geologic processes that formed the canyon as it now exists occurred less than 20,000 years ago during the Ice Age (Pleistocene). The headwaters of Pine Creek, near Ansonia, originally took a northeasterly drainage course. Then a glacier covered the area with ice. Later, as the glacier began to melt and retreat to the northeast, it deposited a blanket of gravel, sand, and clay debris which had been picked up during its advancing movements. The glacially dumped debris “ponded” or blocked the northeasterly flow of Pine Creek slightly north of the present park areas. This natural dam forced Pine Creek to reverse its flow, drain to the south, overflow, and cut through the drainage divide near the present locations of the state parks. The deep erosion and formation of the present Pine Creek Gorge was produced by the subsequent glacial water action.

The sequence of rocks consists of an alternation of different rock types: sandstone (hard), siltstone (less hard), and mudstone and shale (relatively soft). These rocks are multicolored in gray, red, brown, and green hues. Most of the precipitous cliffs at various positions in the gorge and along the trails are held up by the most resistant rock, sandstone.

The gorge is a registered National Natural Landmark.

- REFERENCES:
- Ashley, G. H. (1945), *The Grand Canyon of Pennsylvania*, Pennsylvania Department of Internal Affairs Bulletin 13, no. 7, p. 3-7.
 - McGlade, W. G. (1970), *Leonard Harrison and Colton Point State Parks: The Grand Canyon of Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Park Guide 5.

91. RENOVO VIEW

COUNTY: Clinton

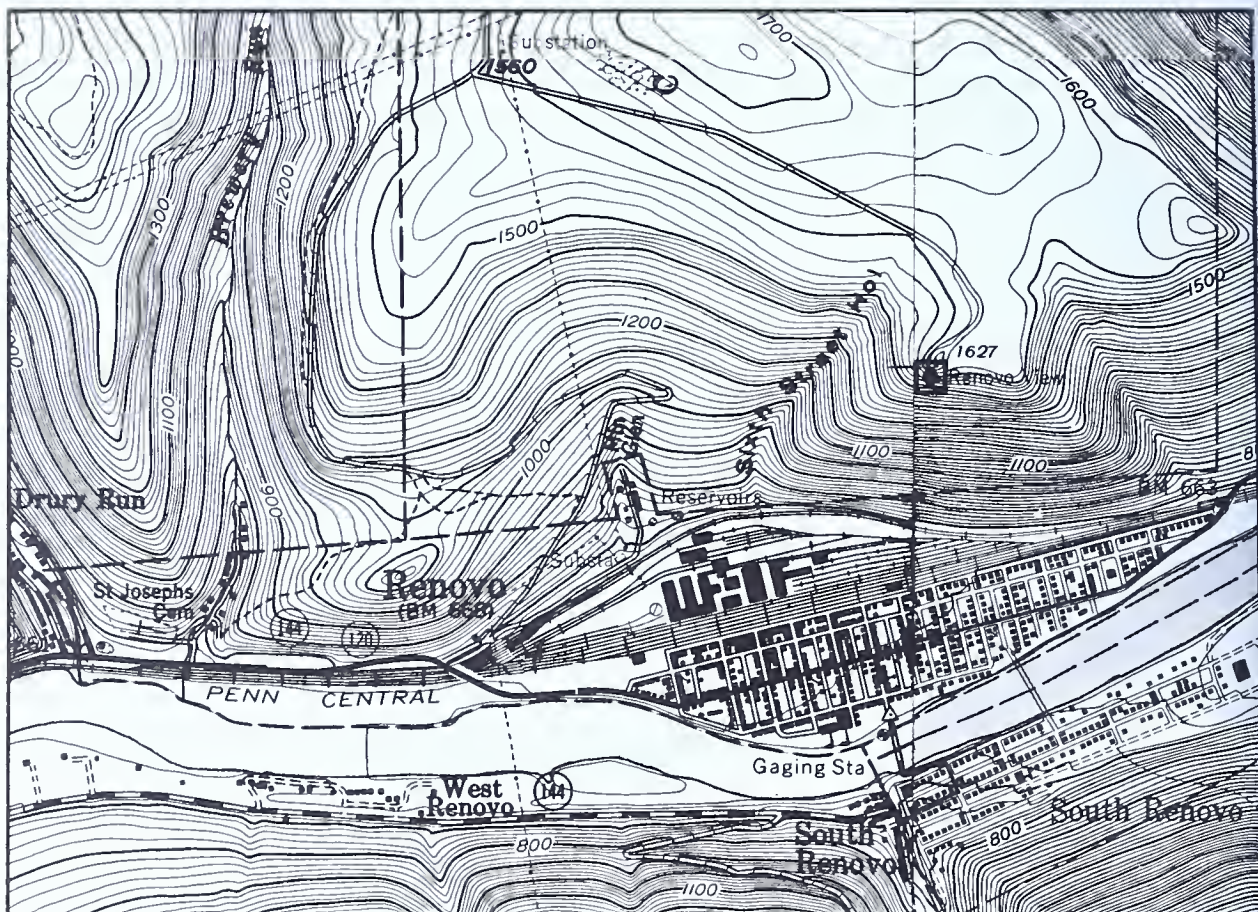
TOWNSHIP: Chapman

QUADRANGLE: Renovo East

LOCATION: Approximately 0.5 mile north of the Borough of Renovo and Pa. Route 120.

REMARKS: A scenic overlook; view of the West Branch of the Susquehanna River and the Allegheny High Plateau. This overlook is perched on a cliff more than 900 feet above the river.

Exposures of sandstone, shale, and conglomerate of the Catskill Formation (Devonian age) are seen along the dirt road winding from the borough to the lookout.



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



92. RIMROCK OVERLOOK

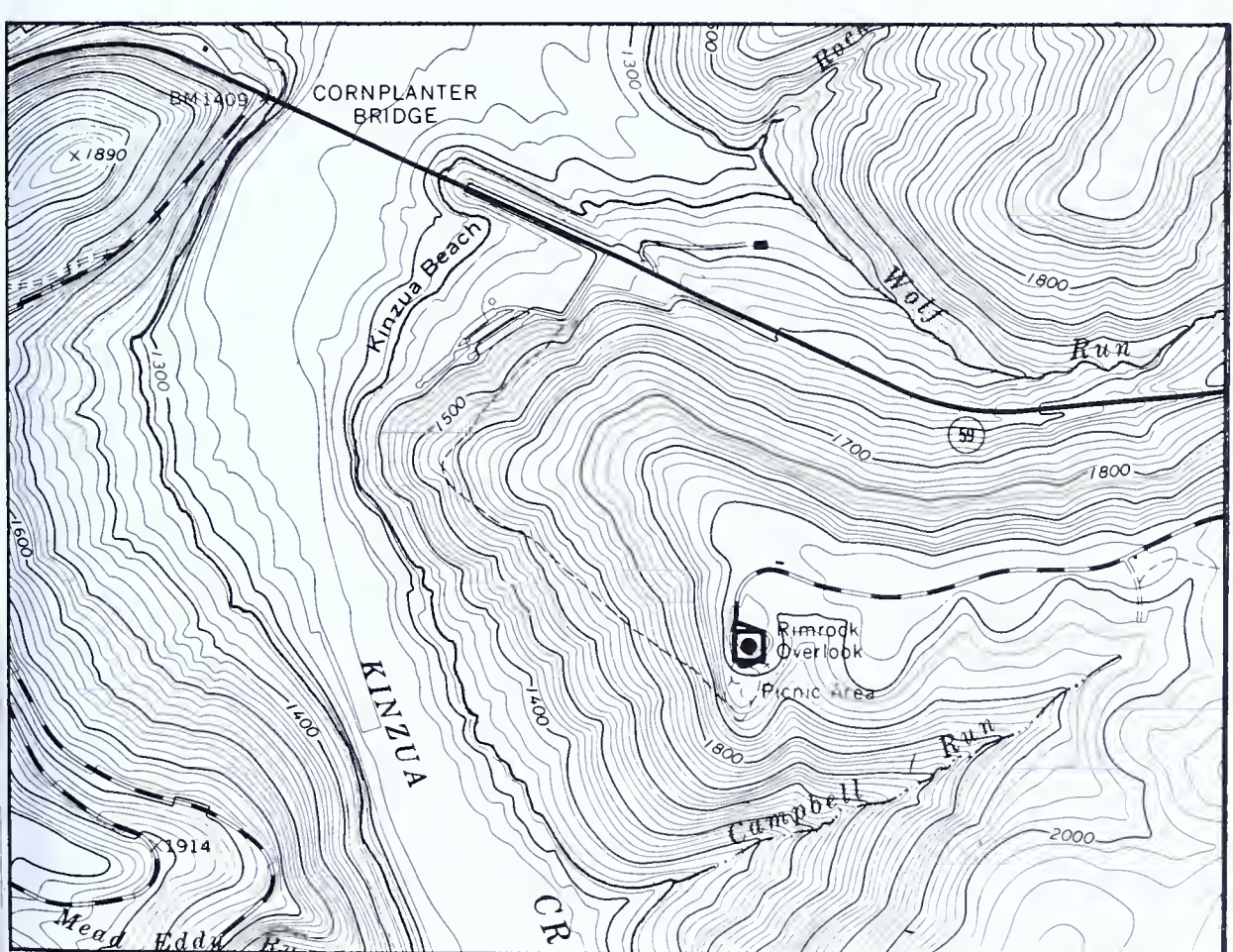
COUNTY: Warren

TOWNSHIP: Mead

QUADRANGLE: Cornplanter Bridge

LOCATION: One mile southeast of Cornplanter Bridge over the Kinzua Creek arm of the Allegheny Reservoir, on the east rim; in the Allegheny National Forest.

REMARKS: Conglomerate of the Olean Formation (Pottsville Group, Pennsylvanian age) caps "Rimrock"; numerous small flat pebbles in the conglomerate are of particular interest. A spectacular panoramic view of Kinzua Bay; the site is also known as **Sams Rocks** (93).



92. RIMROCK OVERLOOK *(continued)*



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



94. ROUTE 44 SCENIC HIGHWAY

COUNTIES: Potter and
Lycoming

TOWNSHIPS: Sweden, Summit, West
Branch, Abbott, and
Stewardson (Potter
County); Brown,
McHenry, Cummings,
Watson, and Porter
(Lycoming County)

QUADRANGLES: Sweden Valley, Ayers Hill, Cherry Springs, Gale-
ton, Oleona, Lee Fire Tower, Slate Run, Glen
Union, Jersey Mills, Waterville, and Jersey Shore

LOCATION: Pa. Route 44 between U. S. Route 6 at Sweden
Valley and U. S. Route 220 near Jersey Shore; also
known as the Coudersport-Jersey Shore Turnpike;
part of Susquehannock and Tiadaghton State
Forests.

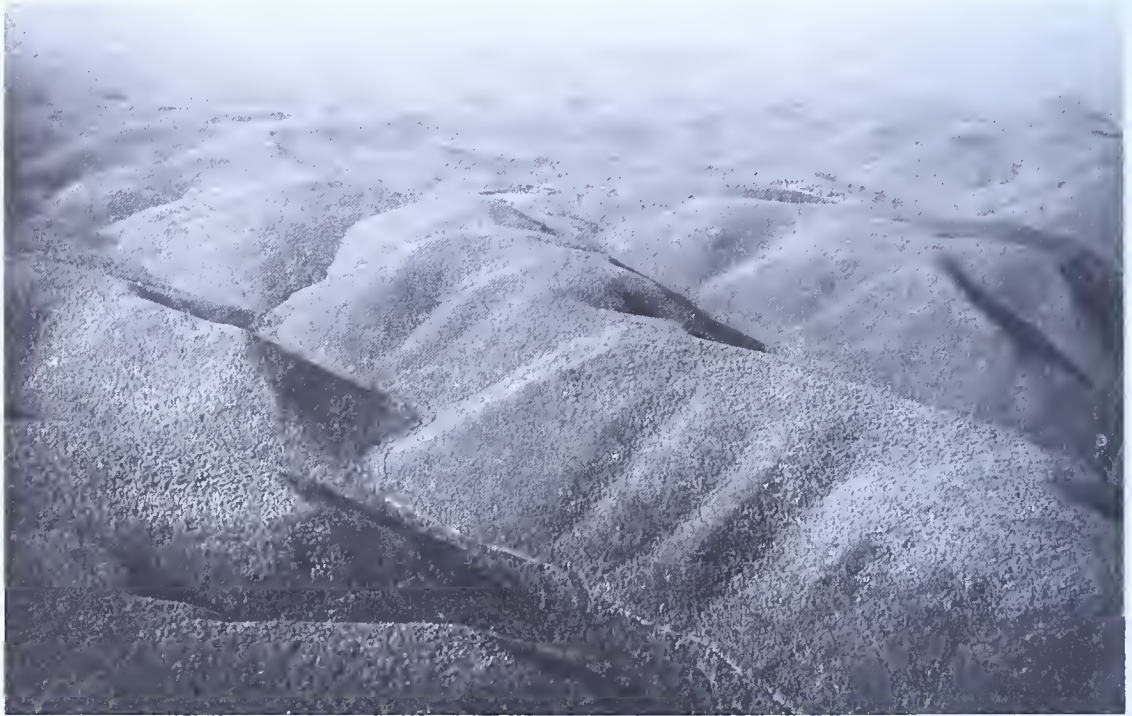
REMARKS: "Scenic Highway" signs are visible along the road
at several locations; for its length, a total of ap-
proximately 55 miles, this road is one of the most
scenic in Pennsylvania; vistas, scenic areas, nar-
row and flat plateau divides, and deep gorges are
all part of the setting.



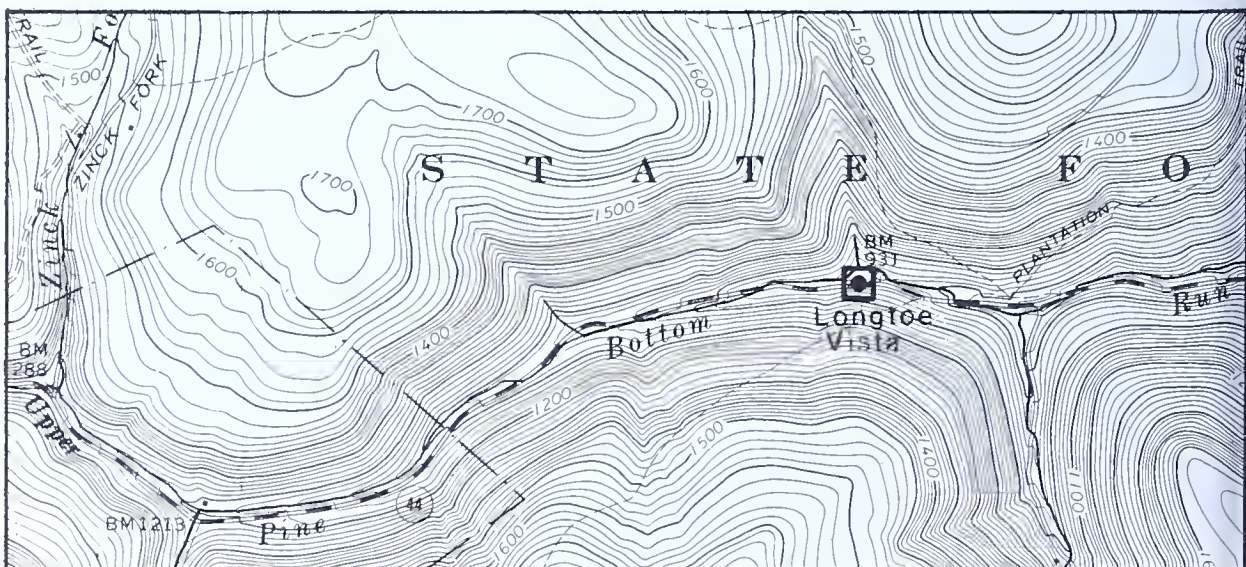
94. ROUTE 44 SCENIC HIGHWAY (continued)

Between Sweden Valley and Haneyville, the road traverses the top of the plateau — **Longtoe Vista** (95), **Cherry Springs Scenic Area** (96) (Cherry Springs State Park), **Deck Lane Vista** (97), **Hyner Run Vista** (98), **Pine Mountain Vista** (99), and **Benson Ridge Vista** (100) are located along this section; **Pine Creek Gorge** (86), **Kettle Creek Gorge** (101), and **Slate Run Gorge** (102), located adjacent to Route 44, are three of the most spectacular gorges in the High Plateaus section.

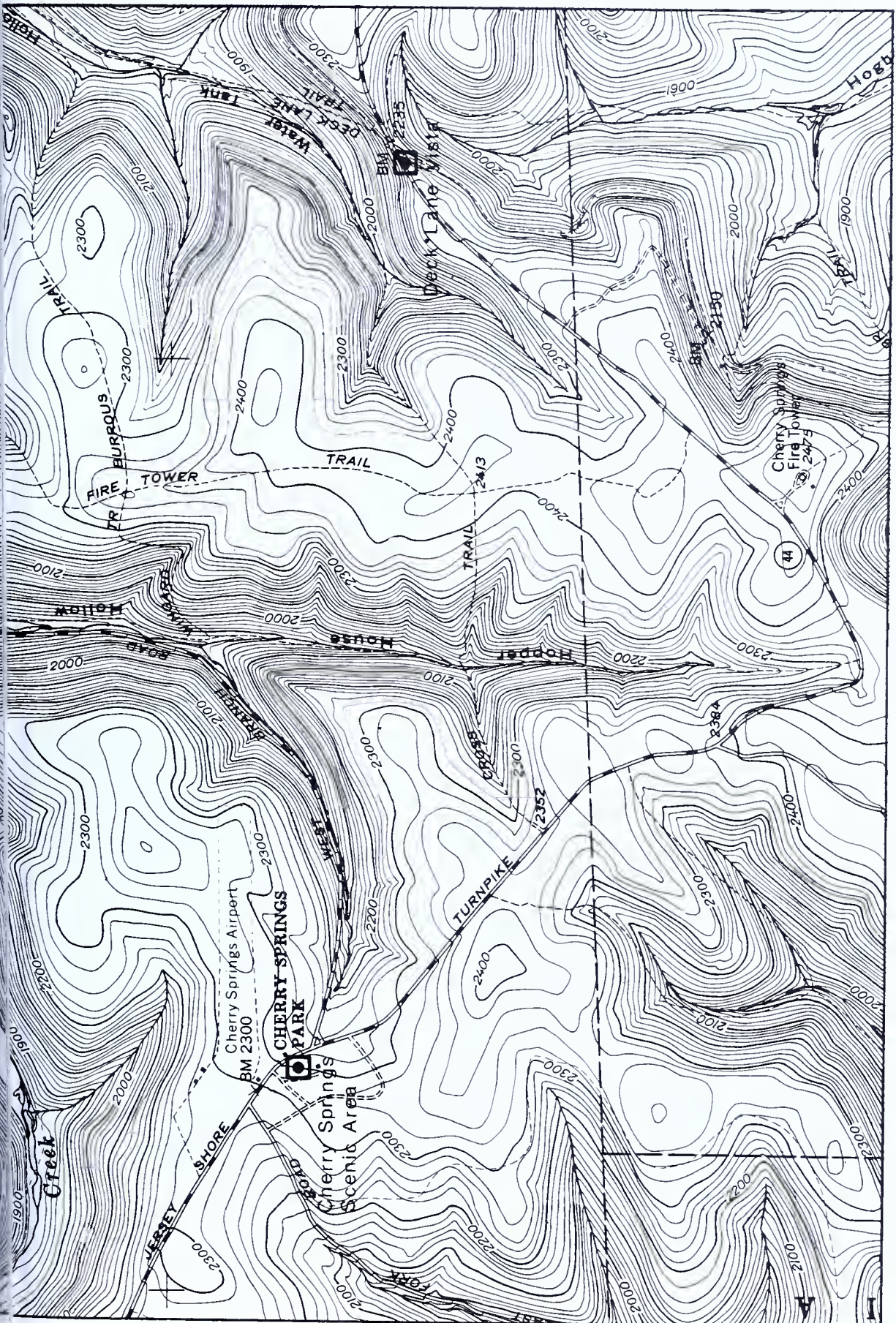
Between Haneyville and U. S. Route 220, the road traverses extremely scenic gorge bottom land; steep rock cliffs, waterfalls, and narrow, flat valleys are characteristic; **Upper Pine Bottom Scenic Area** (103) (State picnic area) is located along this section.



(Photograph by Grant Heilman)



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



104. STONY POINT

COUNTY: Forest

TOWNSHIP: Kingsley

QUADRANGLE: Kellettsville

LOCATION: Nine tenths of a mile south of the village of Kellettsville and Pa. Route 666; within the Allegheny National Forest.

REMARKS: Outcrops of sandstone and conglomerate (Pottsville Group, Pennsylvanian age) cap the ridge. These rock types are more resistant to weathering and therefore often form the highest peaks on the plateau; **Fools Knob** (105) in Hickory Township is a similar feature.

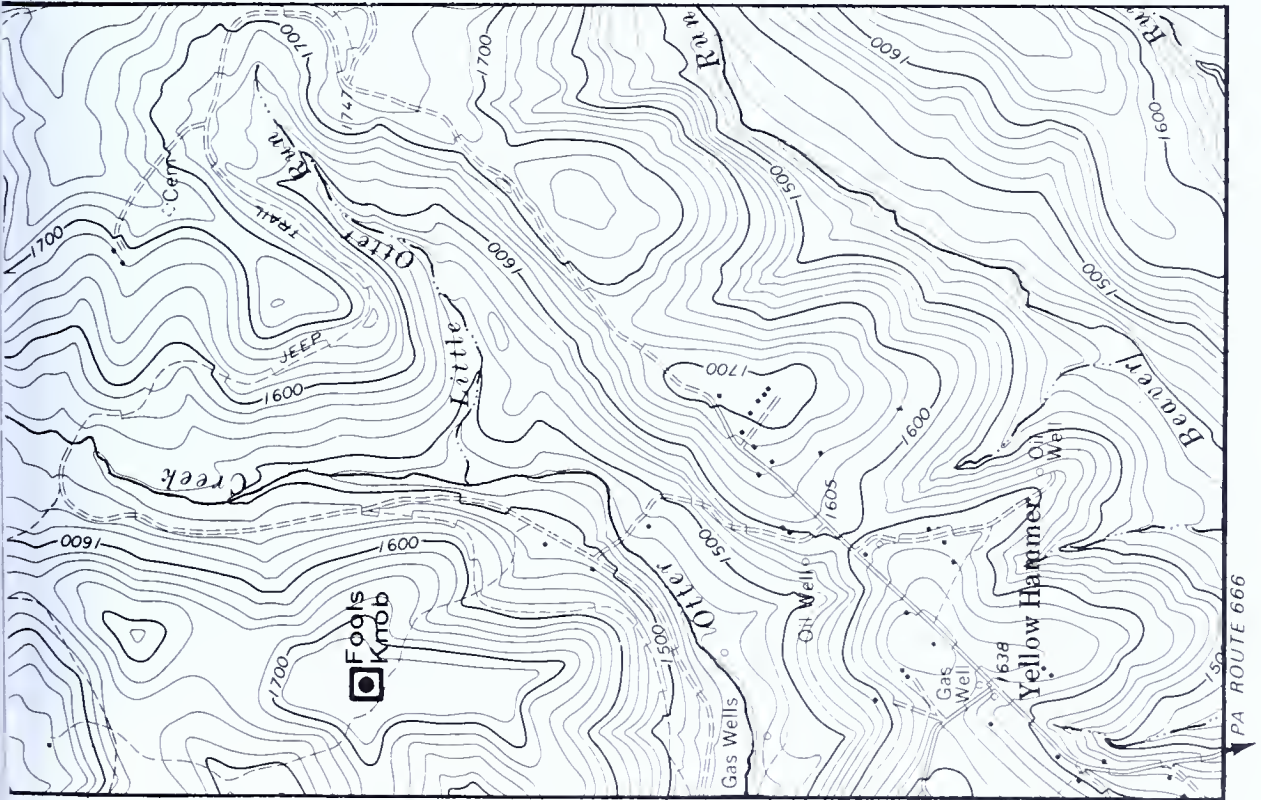
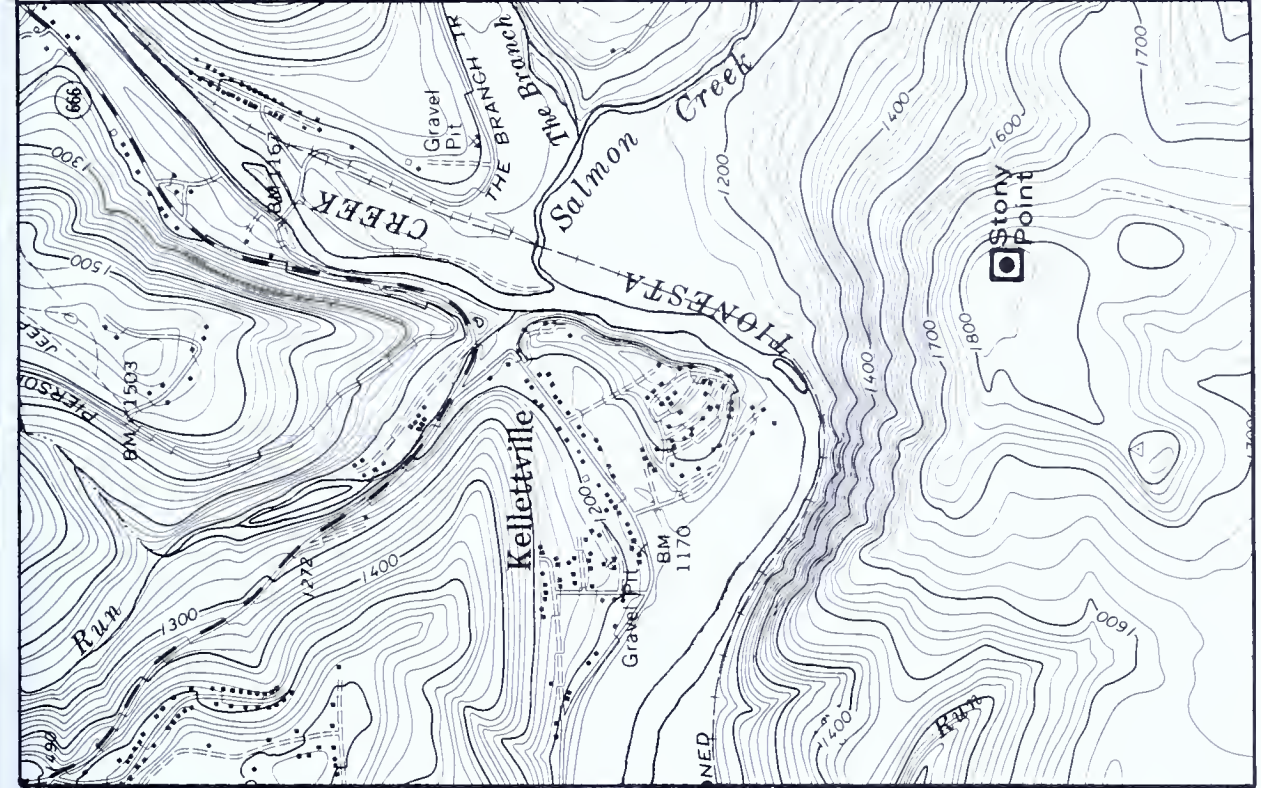


STONY POINT

APPALACHIAN PLATEAUS PROVINCE
 ALLEGHENY HIGH PLATEAUS SECTION



MAYBURG 3.8 MI.
 SHEFFIELD (U.S. 6) 23 MI.



106. THE BUNK

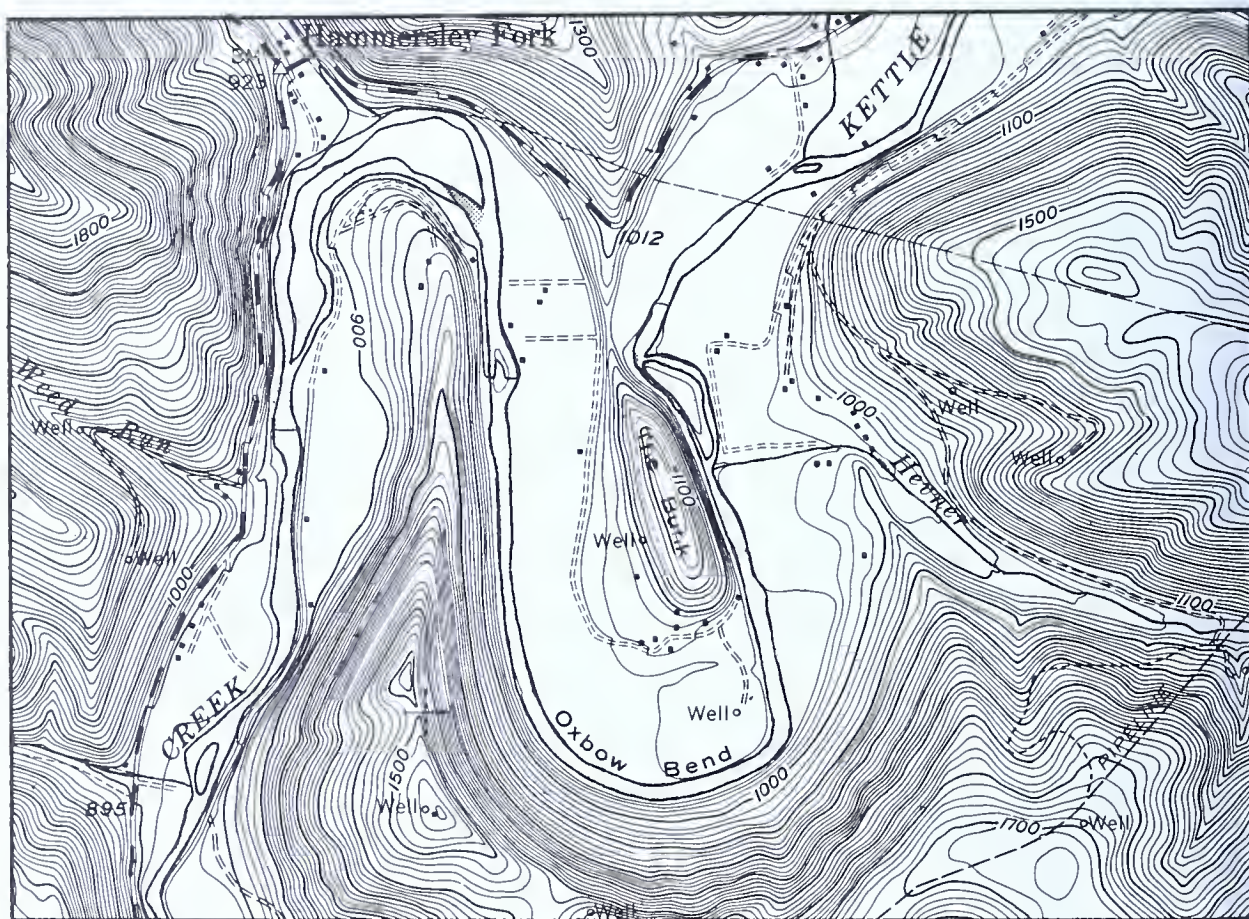
COUNTY: Clinton

TOWNSHIP: Leidy

QUADRANGLE: Hammersley Fork

LOCATION: Along Kettle Creek, 1 mile south of the village of Hammersley Fork and Pa. Route 144.

REMARKS: An ancient meander of Kettle Creek eroded the land within the meander into the shape of a built-in bed or bunk. The bend area of the meander resembles an oxbow and is known as **Oxbow Bend** (107).



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



108. THE KNOBS

COUNTY: Clearfield

TOWNSHIP: Girard

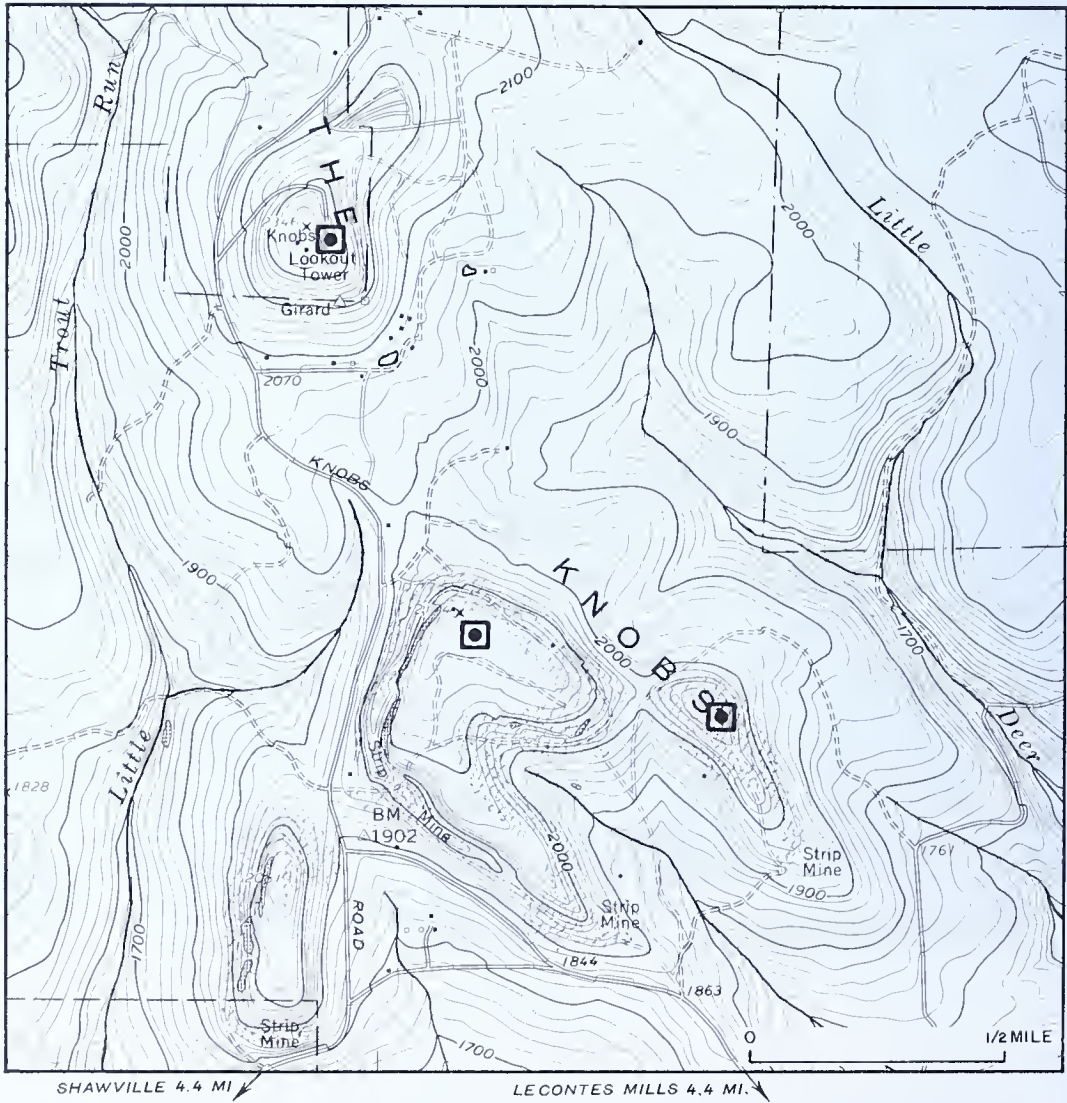
QUADRANGLE: The Knobs

LOCATION: Four and four-tenths miles north of Lecontes Mills; divide between Little Trout Run and Little Deer Creek; within Moshannon State Forest.

REMARKS: A tough, hard, resistant sandstone near the top of the Allegheny Group (Pennsylvanian age) caps these knobs. This high elevation (2346 feet above sea level), due to the weather-resistant character of the rock, provides an excellent view of the topographic transition area between the Pittsburgh Plateaus and Allegheny High Plateaus sections.



108. THE KNOBS (continued)



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



109. THE PASS

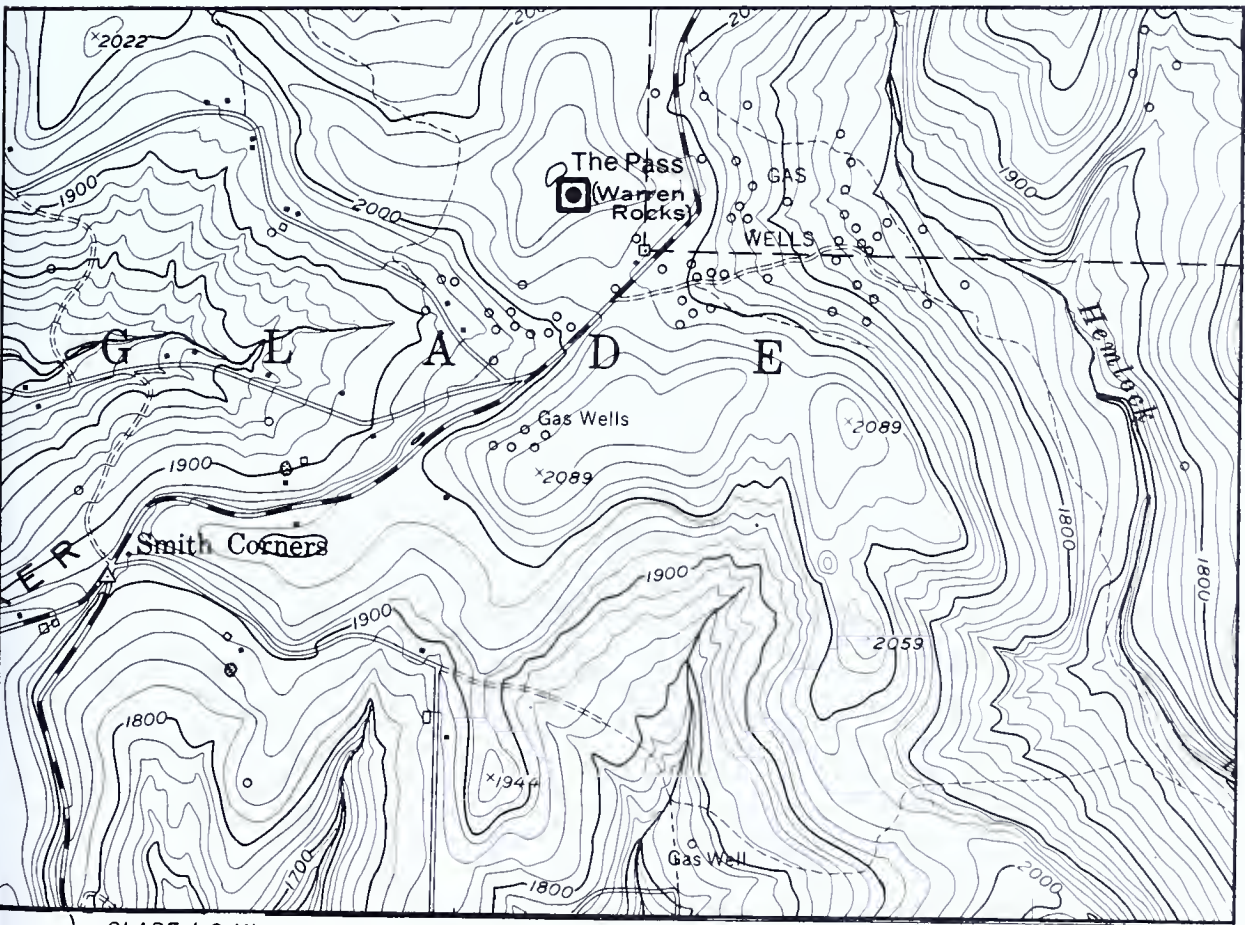
COUNTY: Warren TOWNSHIP: Elk

QUADRANGLE: Scandia

LOCATION: Along Scandia Road to Scandia, about 6.5 miles northeast of Warren and the junction of U.S. Route 6.

REMARKS: A "rock city" of conglomerate of the Olean Formation (Pottsville Group, Pennsylvanian age); joint fractures in the conglomerate have been enlarged by weathering to form the so-called "streets" of the rock city.

This geologic feature is also known as **Warren Rocks** and **Singular Rocks**.

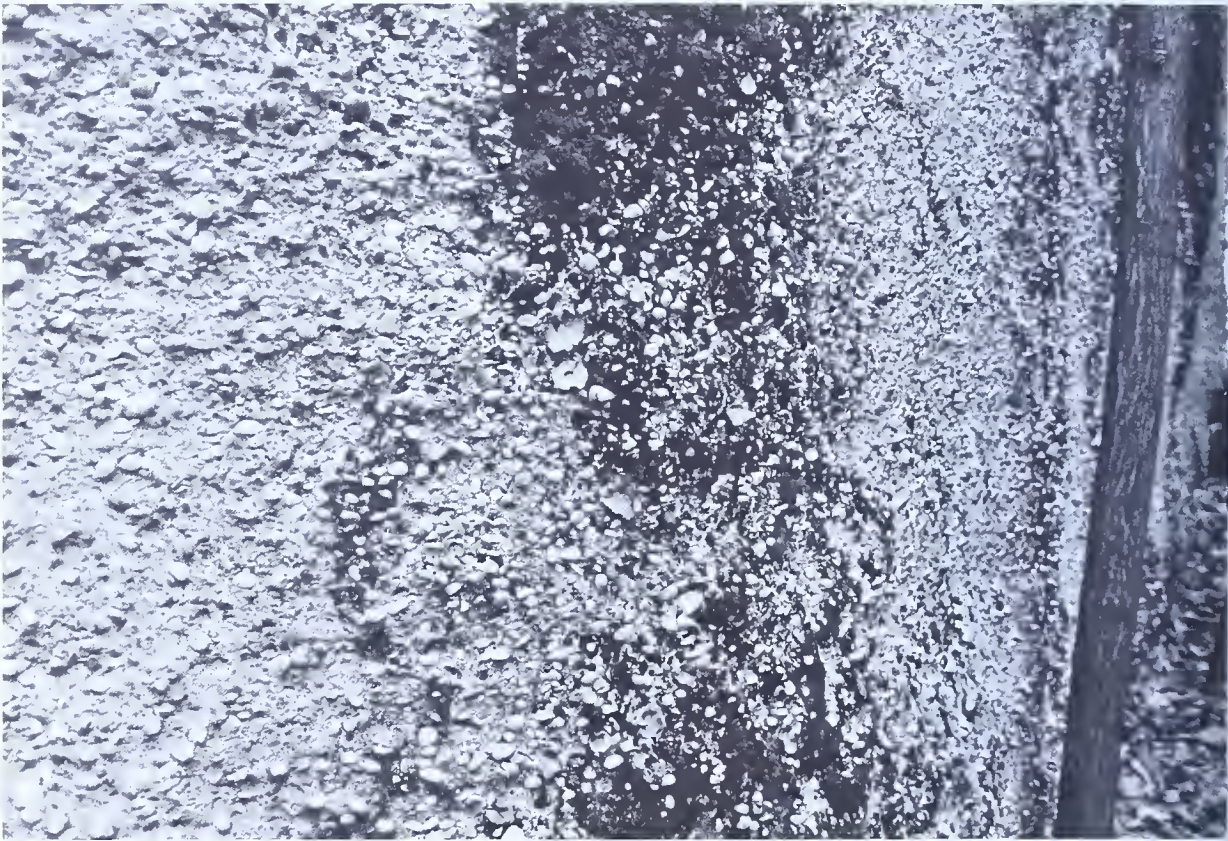


109. THE PASS (*continued*)

REFERENCES:

Carll, J. F. (1883), *Geological report on Warren County and the neighboring oil regions*, Pennsylvania Geological Survey, 2nd ser., Report 14, p. 186-187.

Lobeck, A. K. (1927), *A popular guide to the geology and physiography of Allegany State Park*, New York State Museum Handbook 1, University of the State of New York, Albany, New York, 288 p.



NOTES:

APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



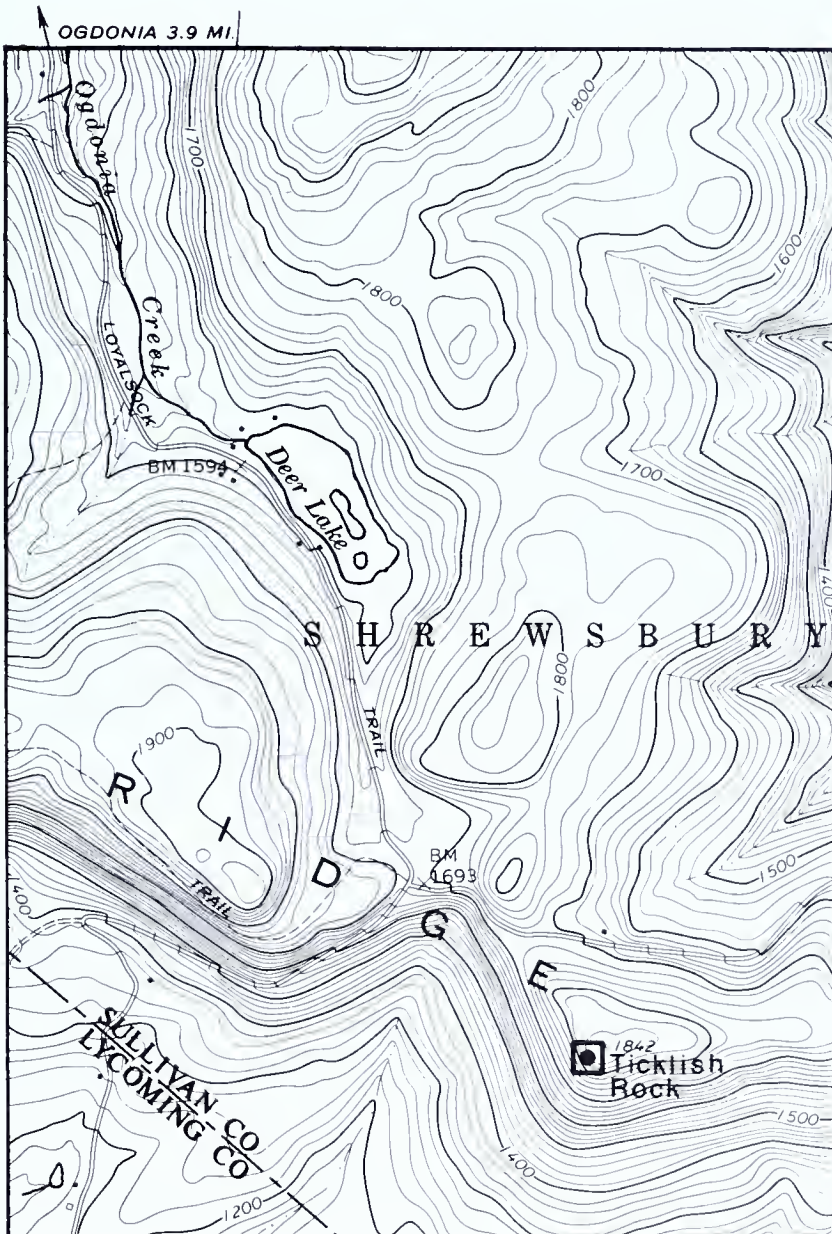
110. TICKLISH ROCK

COUNTY: Sullivan

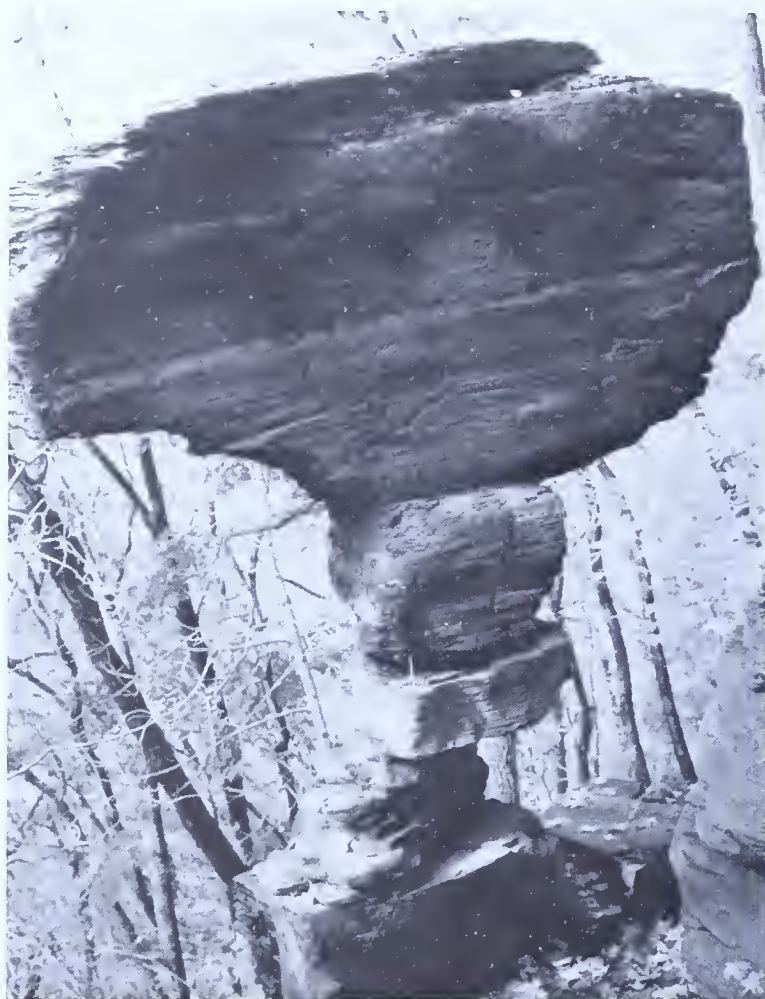
TOWNSHIP: Shrewsbury

QUADRANGLE: Picture Rocks

LOCATION: From U. S. Route 220, 5 miles north of Picture Rocks at Glen Mawr, up Rock Run 2 miles to Rock Run Church, on the left fork 2.3 miles to a house, and then up the path to the top of the ridge.



110. TICKLISH ROCK (*continued*)



REMARKS:

A block of flat-lying, brown and green sandstone (Catskill Formation, Devonian age), 3 by 8 feet in cross section, 6 feet thick, resting on a pedestal that is 18 by 30 inches. The outcrop is on the rim of the Allegheny Ridge; an excellent example of differential weathering.

REFERENCE:

Pennsylvania Department of Internal Affairs (1939), *Ticklish Rock—One of State's curious formations*, Pennsylvania Department of Internal Affairs Monthly Bulletin 7, no. 11, p. 3-4.

APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY HIGH PLATEAUS SECTION



111. TIDIOUTE OVERLOOK

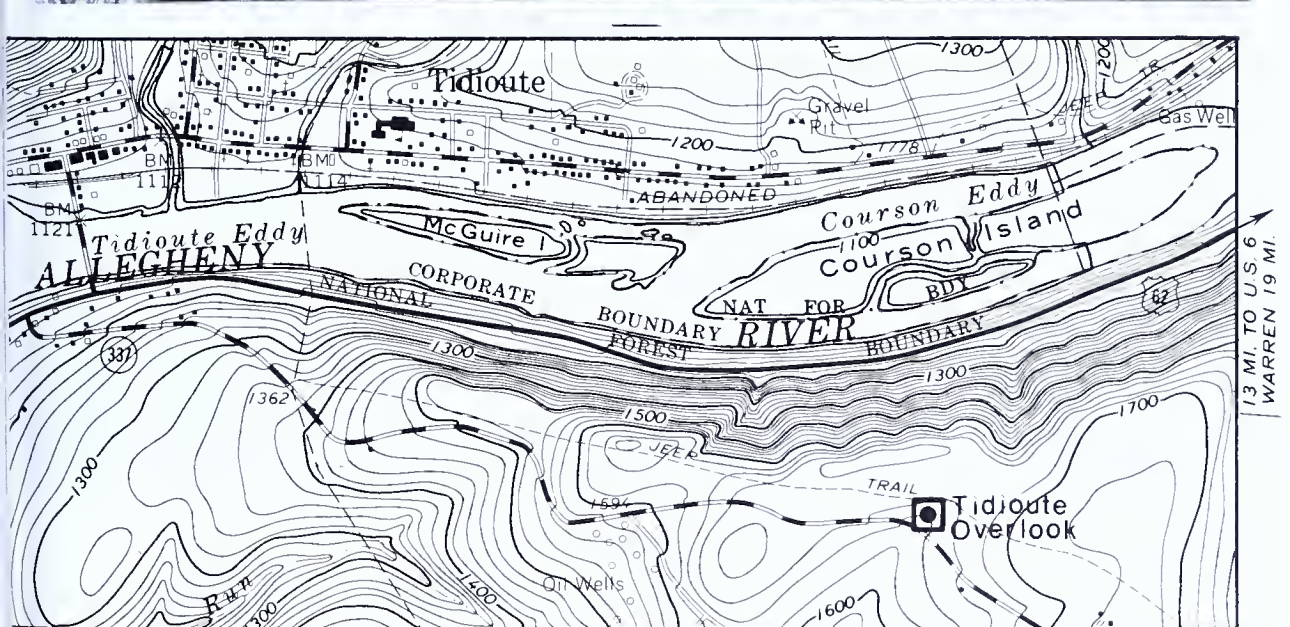
COUNTY: Warren

TOWNSHIP: Limestone

QUADRANGLE: Tidioute

LOCATION: Within the Allegheny National Forest; south of Tidioute along the south rim of the Allegheny River.

REMARKS: An outstanding vista of the High Plateaus and the Allegheny River valley.



112. TOMPKINS CORNERS VISTA

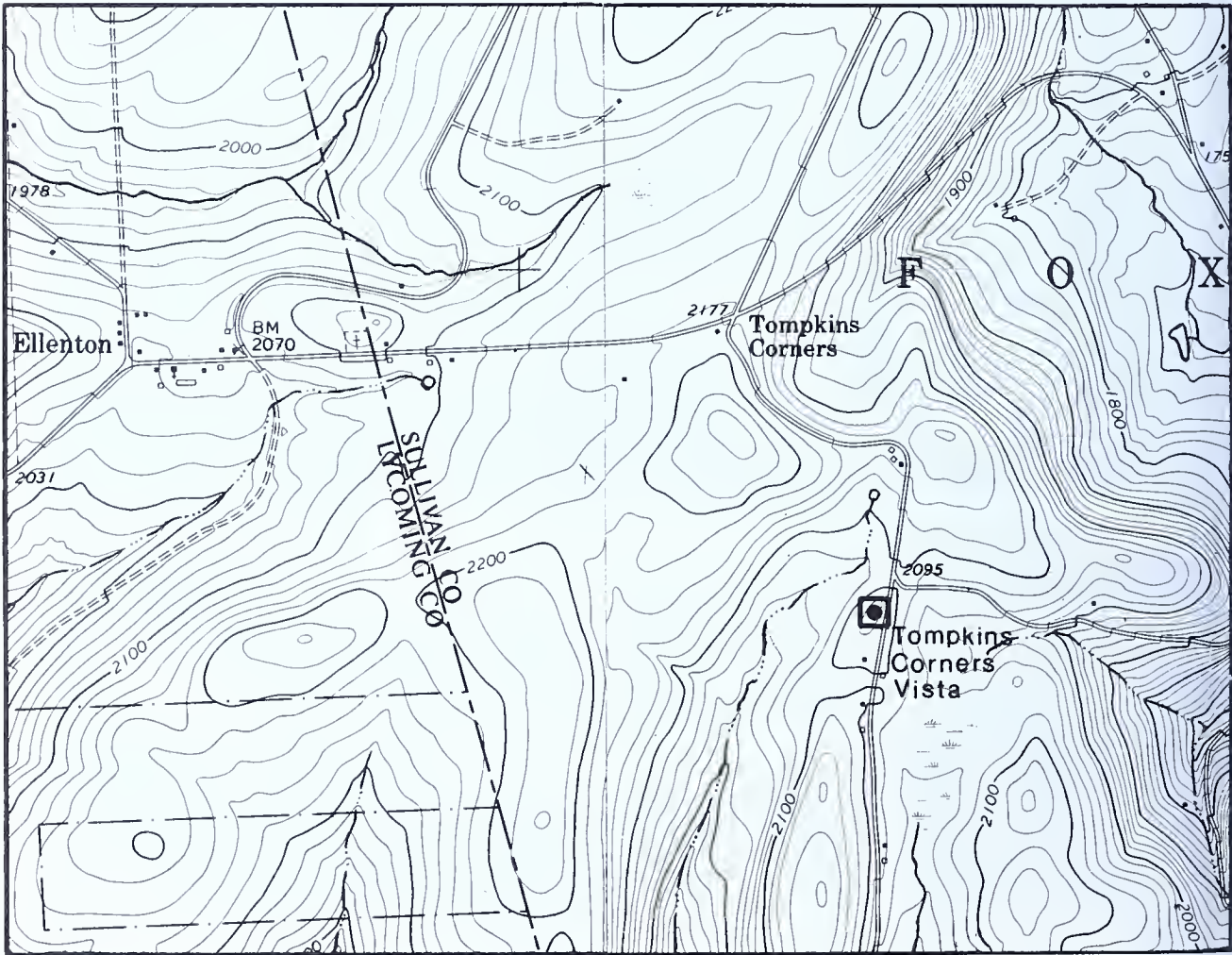
COUNTY: Sullivan

TOWNSHIP: Fox

QUADRANGLE: Grover

LOCATION: Approximately one-half mile south of the village of Tompkins Corners.

REMARKS: A view of the High Plateau and its tabletop-like summits and deeply dissected stream valleys.



113. TRIPLE DIVIDE

TOWNSHIP: Ulysses

QUADRANGLE: Brookland

LOCATION: Two and one-fourth miles north of the point where Allegany, Sweden, and Ulysses Townships join; a relatively flat hill about 800 feet long and almost 400 feet wide at an altitude of 2520 feet above sea level.

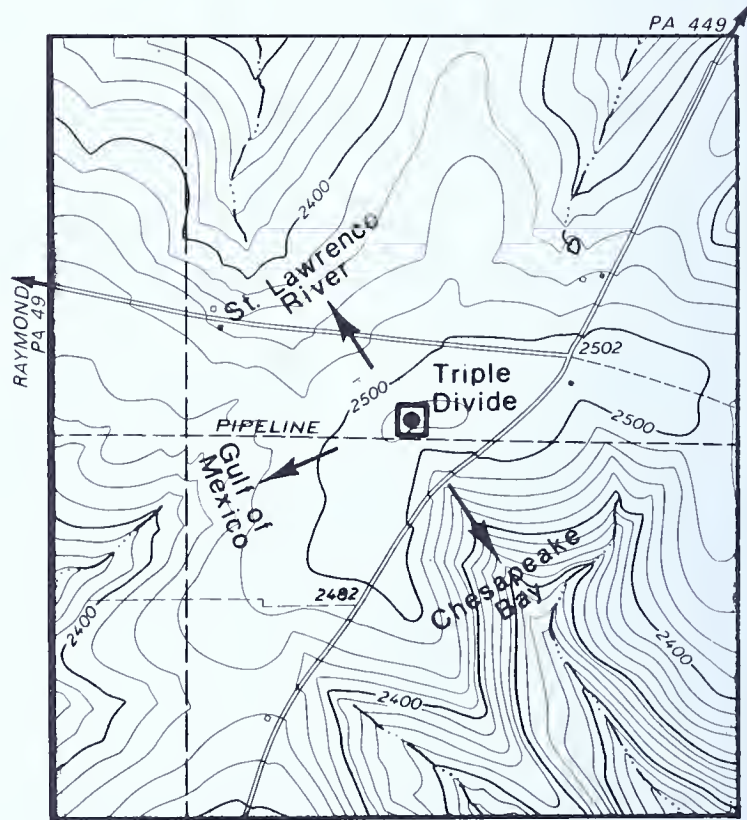
REMARKS: This small hill marks the divide between waters going west to the Ohio River, Mississippi River, and the Gulf of Mexico; those going north to Lake Ontario and the St. Lawrence River; and others going east to the Susquehanna River and the Chesapeake Bay.



113. TRIPLE DIVIDE (continued)

Somewhere on this small hill is a single point where, if one spilled a bucket of water, some of the water would flow toward Newfoundland, some toward Norfolk, and the rest toward New Orleans.

Few states have a natural site showing so precisely the separation of three major drainage systems.



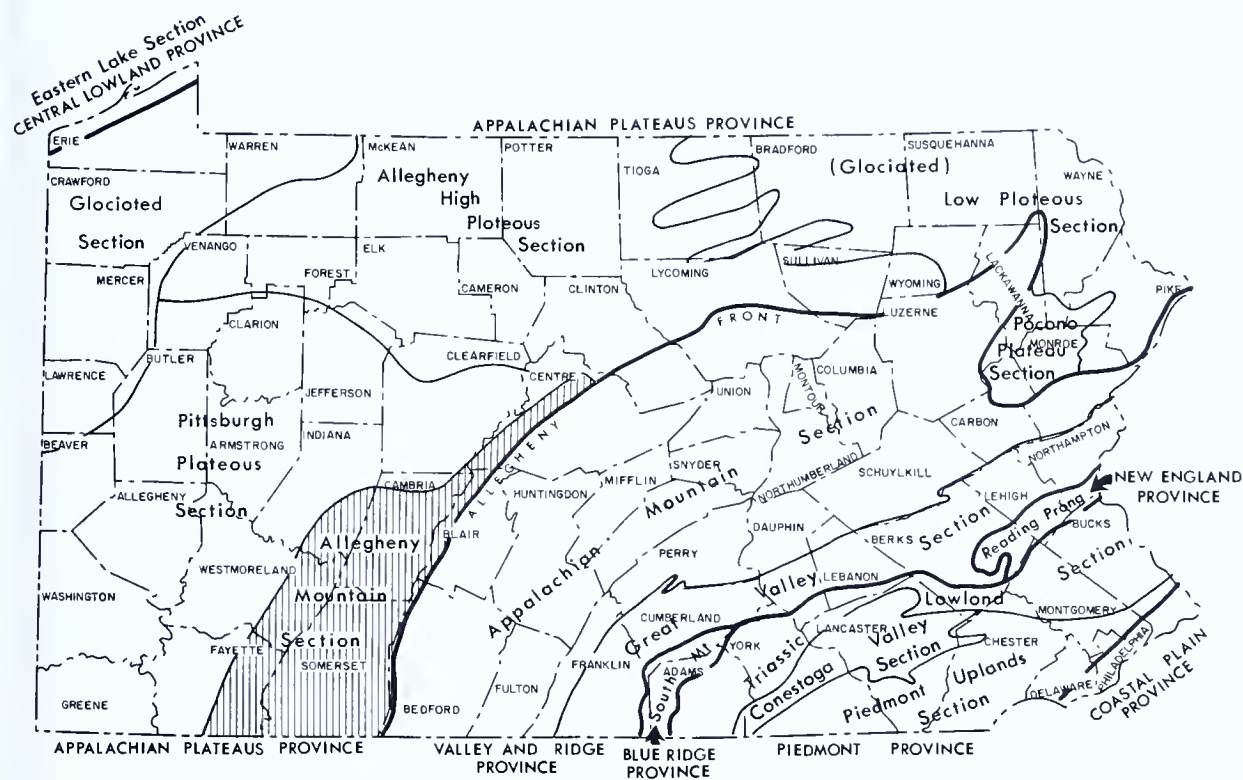
REFERENCE: Pennsylvania Department of Internal Affairs (1936), *Potter County waters travel to Quebec, Norfolk, and New Orleans*, Pennsylvania Department of Internal Affairs Monthly Bulletin 2, no. 3, p. 11-13.

APPALACHIAN PLATEAUS PROVINCE — ALLEGHENY MOUNTAIN SECTION

TOPOGRAPHY

The Allegheny Mountain section of the Appalachian Plateaus province is bounded on the west by Chestnut Ridge (crest is 2778 feet above sea level) and Laurel Hill (crest ranges from 2800 to over 3000 feet above sea level) and on the east by the Allegheny Front.

The greatest local relief within this section is approximately 1600 feet at the Conemaugh River gap through Laurel Hill.



ROCK COLUMN

The rock column is composed mostly of shale, siltstone, sandstone, and conglomerate. No carbonates occur in the Devonian rocks, but the Mississippian and Pennsylvanian Systems contain some in minor amounts. The limestones are thin and interbedded with shales and sandstones. The Pennsylvanian System also includes beds of clay (mudstone) and coal.

Shale is the most common rock type in the section. Sandstones are present throughout the geologic rock column.

OUTSTANDING SCENIC GEOLOGICAL FEATURES OF PENNSYLVANIA

A description of the rock units follows:

SYSTEM	ROCK UNIT	DESCRIPTION
Pennsylvanian	Monongahela Group	Some limestone; some coal, light-gray sandstone; dark-gray shale; very little of this group is present in this section.
	Conemaugh Group	Some shaly, gray limestone; numerous poor-quality coals; gray shale; coarse-grained sandstone.
	Casselman Formation	Several minable coals; major sandstone units; some shale, claystone, and limestone.
	Glenshaw Formation	Light-gray coarse-grained sandstone; small amounts of gray shale, limestone, coal, and underclay.
Mississippian	Allegheny Group	Gray and green sandstones; red shale, siltstone, and claystone.
	Pottsville Group	Sandy, red to gray, crossbedded limestone.
	Mauch Chunk Formation	Light-gray to greenish-gray sandstone; some shale and siltstone; a few coal beds.
Mississippian and Devonian	Loyalhanna Limestone	Gray, fine- to coarse-grained sandstone; siltstone, shale, and, locally, pebbly mudstone.
	Burgoon Sandstone	Greenish-gray sandstone; minor shale units.
Devonian	Rockwell Formation	Red shale, sandstone, conglomerate, and siltstone.
	Oswayo Formation	Medium- to olive-gray sandstone, siltstone, and shale.
	Catskill Formation	Olive- and greenish-gray, fossiliferous siltstone, shale, and sandstone.
	Foreknobs Formation	
	Scherr Formation	

ROCK STRUCTURE

The major structural features of the section are, from west to east, the Chestnut Ridge anticline, the Ligonier syncline, and the Laurel Hill anticline.

APPALACHIAN PLATEAUS PROVINCE

ALLEGHENY MOUNTAIN SECTION



114. BALD KNOB

COUNTY: Westmoreland

TOWNSHIP: Cook

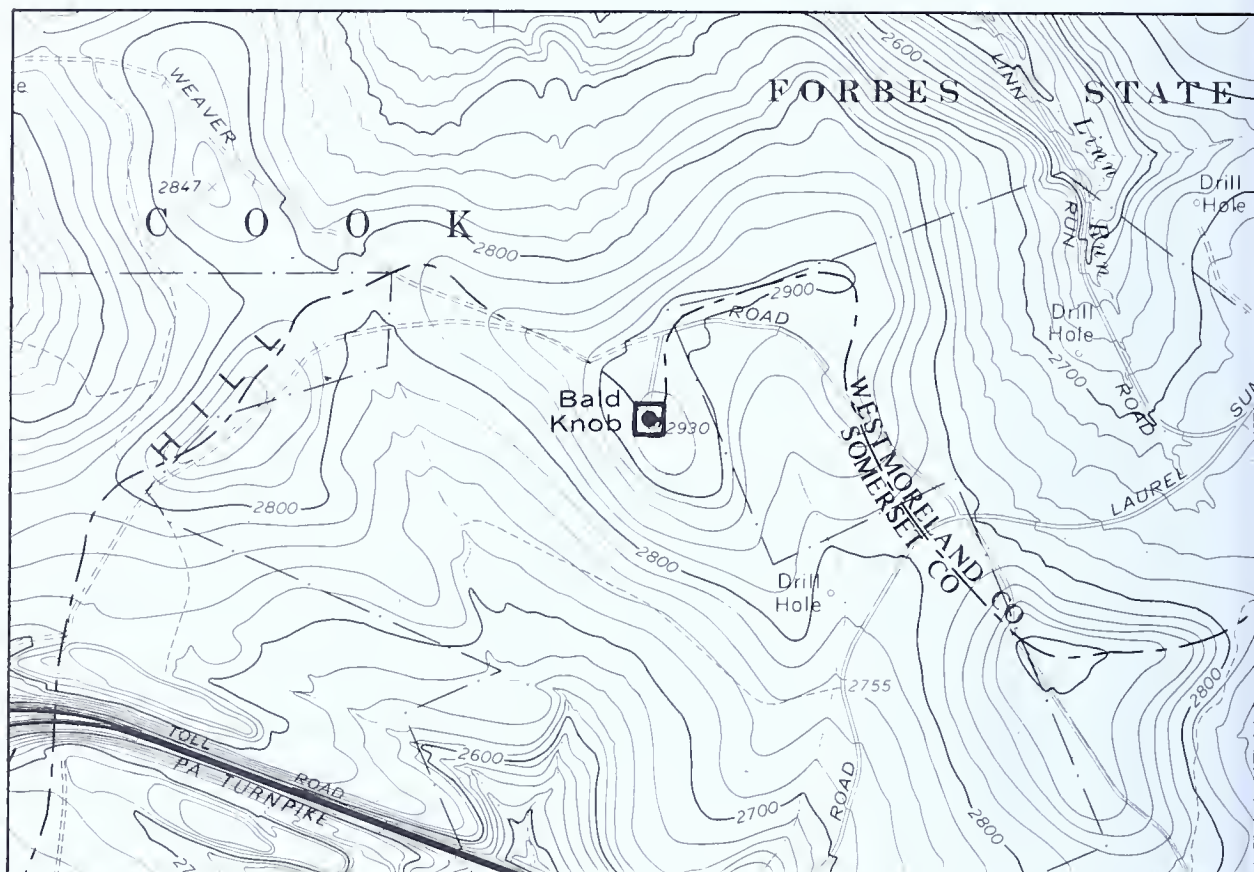
QUADRANGLE: Bakersville

LOCATION: About 3 miles south of U. S. Route 30 in Forbes State Forest; 1.5 miles west of the village of Laurel Summit along the Laurel Summit Road.

REMARKS: The topographic crest of Laurel Hill and the geologic structural axis of the Laurel Hill anticline. Sandstone outcrops of the Allegheny Group (Pennsylvanian age) are exposed through weathering; there is a scenic view from the rim of the mountain. The name was applied to this feature because forest growth was slow to develop on this dry, rocky site. Strange sounds, similar to a swarm of bees, are peculiar to this knob; these sounds are attributed to traffic on the Pennsylvania Turnpike, located about 0.8 mile to the south.



114. **BALD KNOB** *(continued)*



NOTES:

APPALACHIAN PLATEAUS PROVINCE

ALLEGHENY MOUNTAIN SECTION



115. BEAR ROCKS

COUNTY: Westmoreland

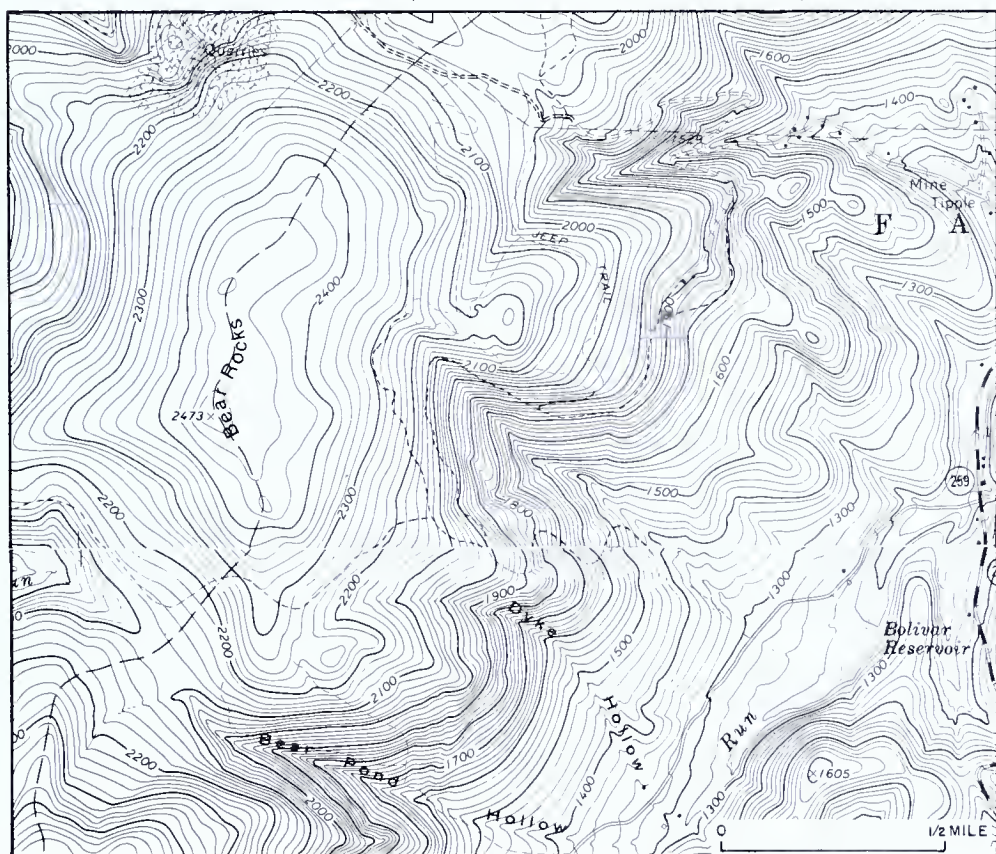
TOWNSHIPS: Derry and
Fairfield

QUADRANGLE: Bolivar

LOCATION: On the crest of Chestnut Ridge about 8 miles west of New Florence; north of Bear Pond Hollow.

REMARKS: Hard, resistant sandstone of the Connoquenesing Formation (Pottsville Group, Pennsylvanian age) caps the elongated knobs on the crest of Chestnut Ridge; approximately 2 acres of weathered sandstone crops out. Joints in the sandstone that have been enlarged by weathering form a miniature "rock city"; very scenic.

REFERENCE: Shaffner, M. N. (1958), *Geology and mineral resources of the New Florence quadrangle, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Atlas 57, 165 p.



116. CASSELMAN GORGE

COUNTY: Somerset

TOWNSHIP: Summit

QUADRANGLE: Murdock

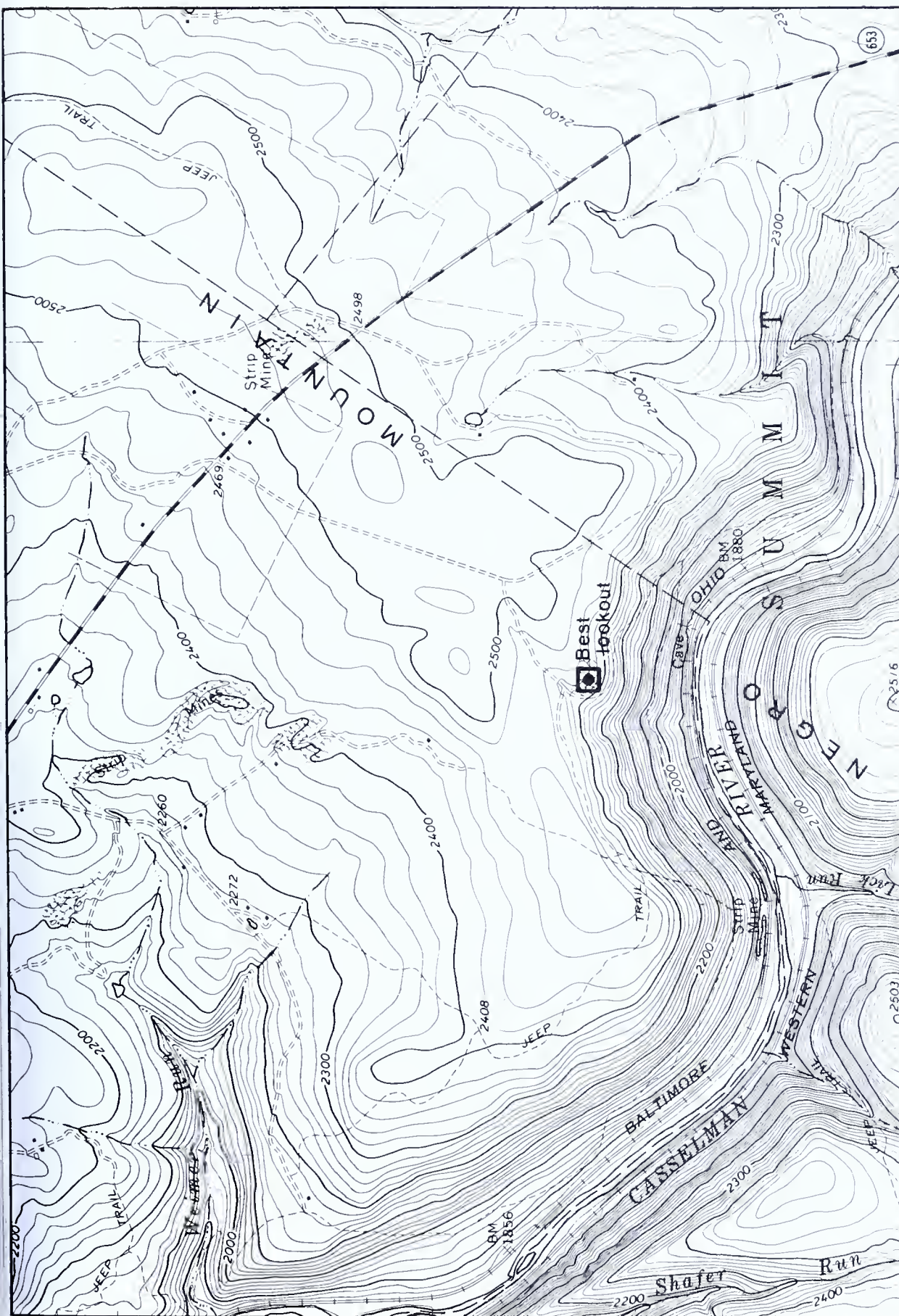
LOCATION: On the crest of Negro Mountain; approximately 3 miles west of the Borough of Garrett.

REMARKS: Picturesque gorge between Rockwood and Garrett, cut through Negro Mountain by the Casselman River. The gorge is located on the crest (axis) of the Negro Mountain anticline, and sandstones, conglomerates, shales, and siltstones from the top of the Pottsville Group (Pennsylvanian age) to the Burgoon Sandstone (Mississippian age) are exposed.



APPALACHIAN PLATEAUS PROVINCE

ALLEGHENY MOUNTAIN SECTION



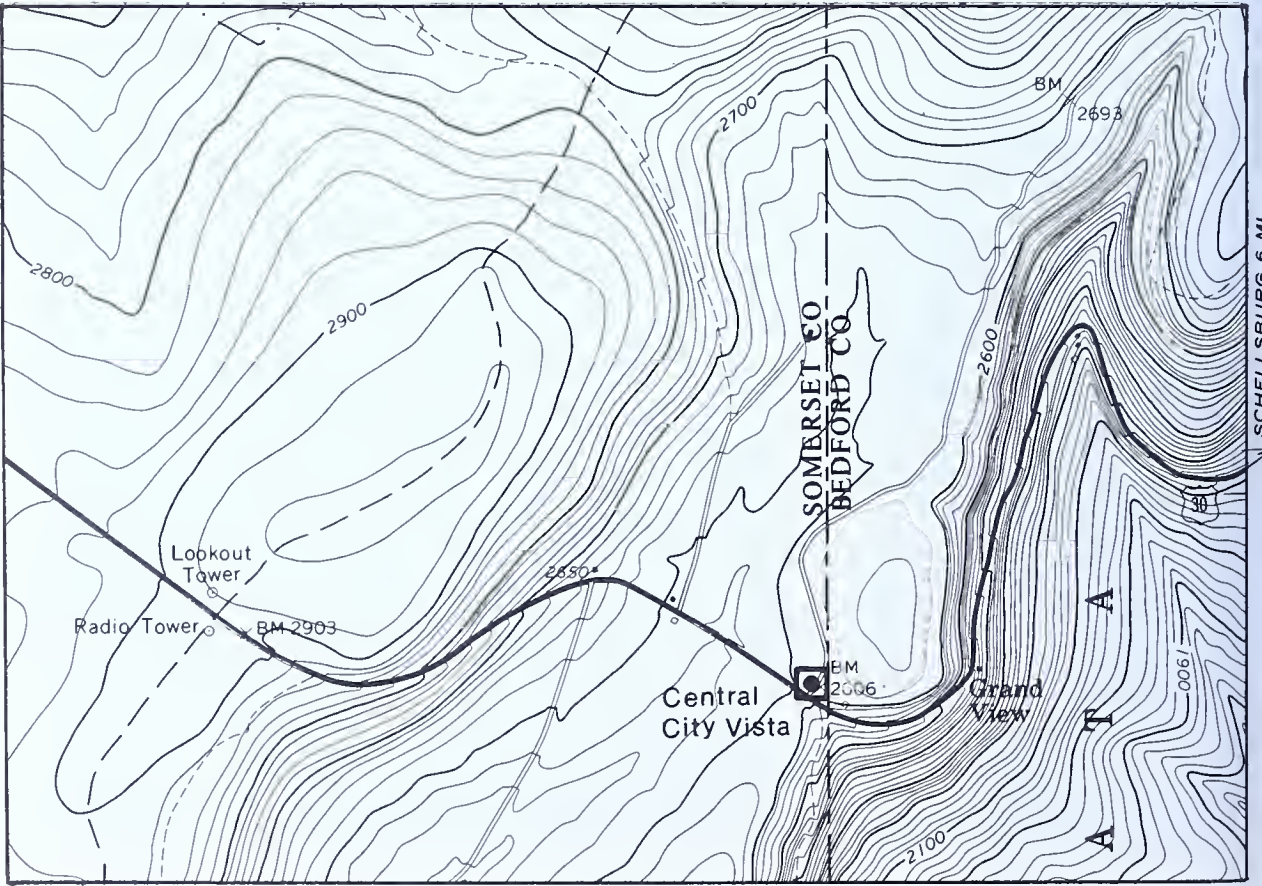
117. CENTRAL CITY VISTA

COUNTY: Somerset TOWNSHIP: Allegheny

QUADRANGLE: Central City

LOCATION: U. S. Route 30, 16.3 miles west of the Borough of Bedford; 4 miles east of the village of Reels Corners.

REMARKS: An exceptional view of the Allegheny Front and the Appalachian Mountain section of the Valley and Ridge province. Highly weather resistant conglomerates of the Burgoon Sandstone (Mississippian age) cap the Allegheny Front, accounting, in part, for the escarpment and relatively high elevation.



APPALACHIAN PLATEAUS PROVINCE

ALLEGHENY MOUNTAIN SECTION



118. CONEMAUGH GORGE

COUNTIES: Cambria,
Westmoreland,
and Indiana

TOWNSHIPS: West Taylor and
Lower Yoder
(Cambria County); St. Clair
(Westmoreland
County); East
Wheatfield (Indiana
County)

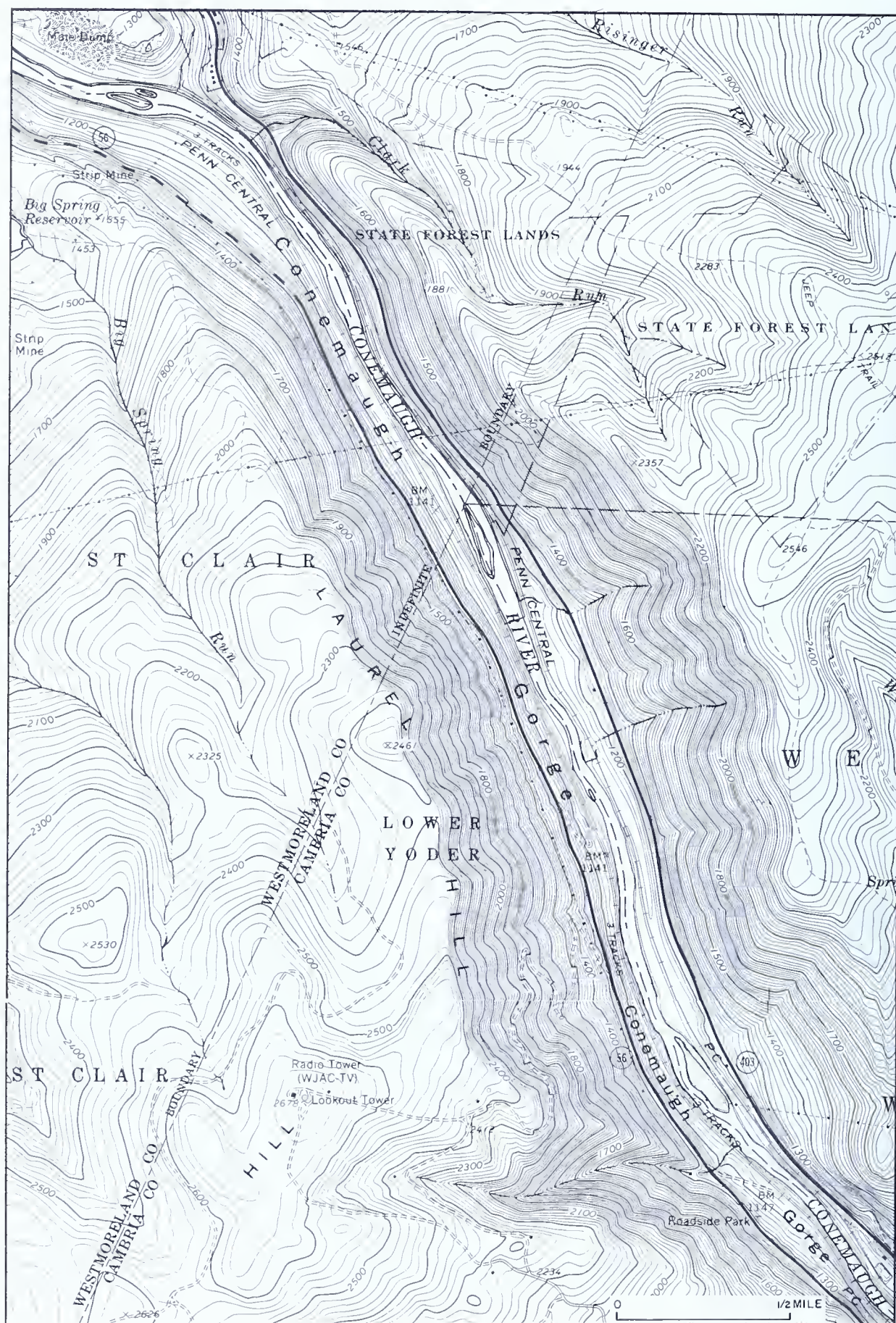
QUADRANGLES: Vintondale and Johnstown

LOCATION: Three miles northwest of the junction of the Little Conemaugh River and Stony Creek in Johnstown; Pa. Routes 403 and 56 parallel the Conemaugh River through the gorge.

REMARKS: The Conemaugh River has eroded flat-lying sandstones, siltstones, and shales to form a magnificent gorge several miles in length. The

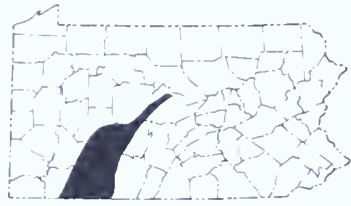


118. CONEMAUGH GORGE (continued)



APPALACHIAN PLATEAUS PROVINCE

ALLEGHENY MOUNTAIN SECTION



topographic crest of the gorge (Laurel Hill) corresponds almost exactly in position to the Laurel Hill anticlinal axis. Massive sandstones of the Pottsville Group (Pennsylvanian age) form the rim, whereas softer, sandy shales of the Oswayo Formation (Devonian age) are exposed at the base. The geologic record of hundreds of millions of years is recorded in the rocks at this site.

Where the crest of the ridge is formed by the massive and resistant sandstones of the Pottsville Group, the land is forested and relatively unpopulated. Laurel Hill is an excellent example of the influence of the rocks on man's activities; the ridge is covered with massive sandstone boulders and is practically uninhabited.

REFERENCE: Phalen, W. C. (1910), *Johnstown, Pa.*, U. S. Geological Survey Atlas, Folio 174, 16 p.

NOTES:

119. CONEMAUGH WATER GAP

COUNTIES: Westmoreland
and Indiana

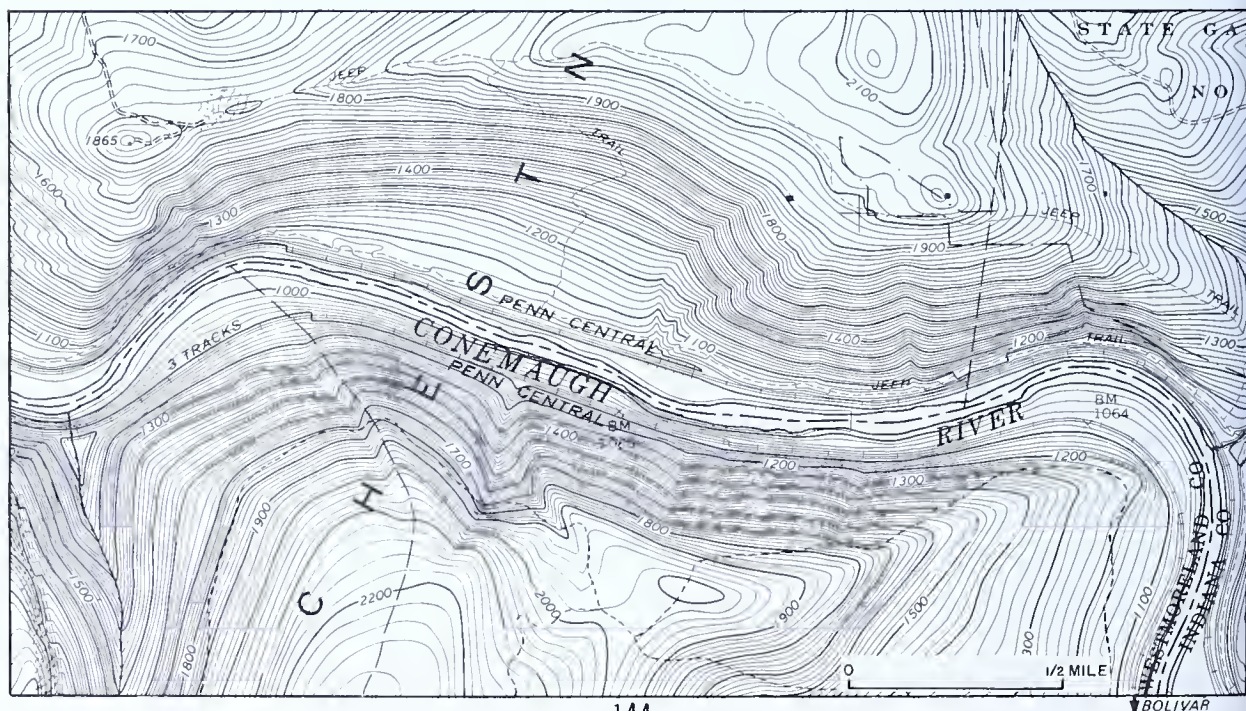
TOWNSHIPS: Fairfield (West-
moreland
County); Bur-
rell (Indiana
County)

QUADRANGLE: Bolivar

LOCATION: About 1.7 miles west of the Borough of Bolivar where the Conemaugh River flows through Chestnut Ridge.

REMARKS: An extremely scenic water gap eroded by the Conemaugh River through Chestnut Ridge; the topographic crest of Chestnut Ridge coincides with the axis of the Chestnut Ridge anticline. Massive sandstones of the Pottsville Group (Pennsylvanian age) form the rim, whereas softer, sandy shales of the Oswayo Formation (Devonian age) are exposed at the base. The geologic record of hundreds of millions of years is recorded in the exposed rocks.

REFERENCE: Shaffner, M. N. (1958), *Geology and mineral resources of the New Florence quadrangle, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Atlas 57, 165 p.



APPALACHIAN PLATEAUS PROVINCE

ALLEGHENY MOUNTAIN SECTION



120. DIVIDING RIDGE

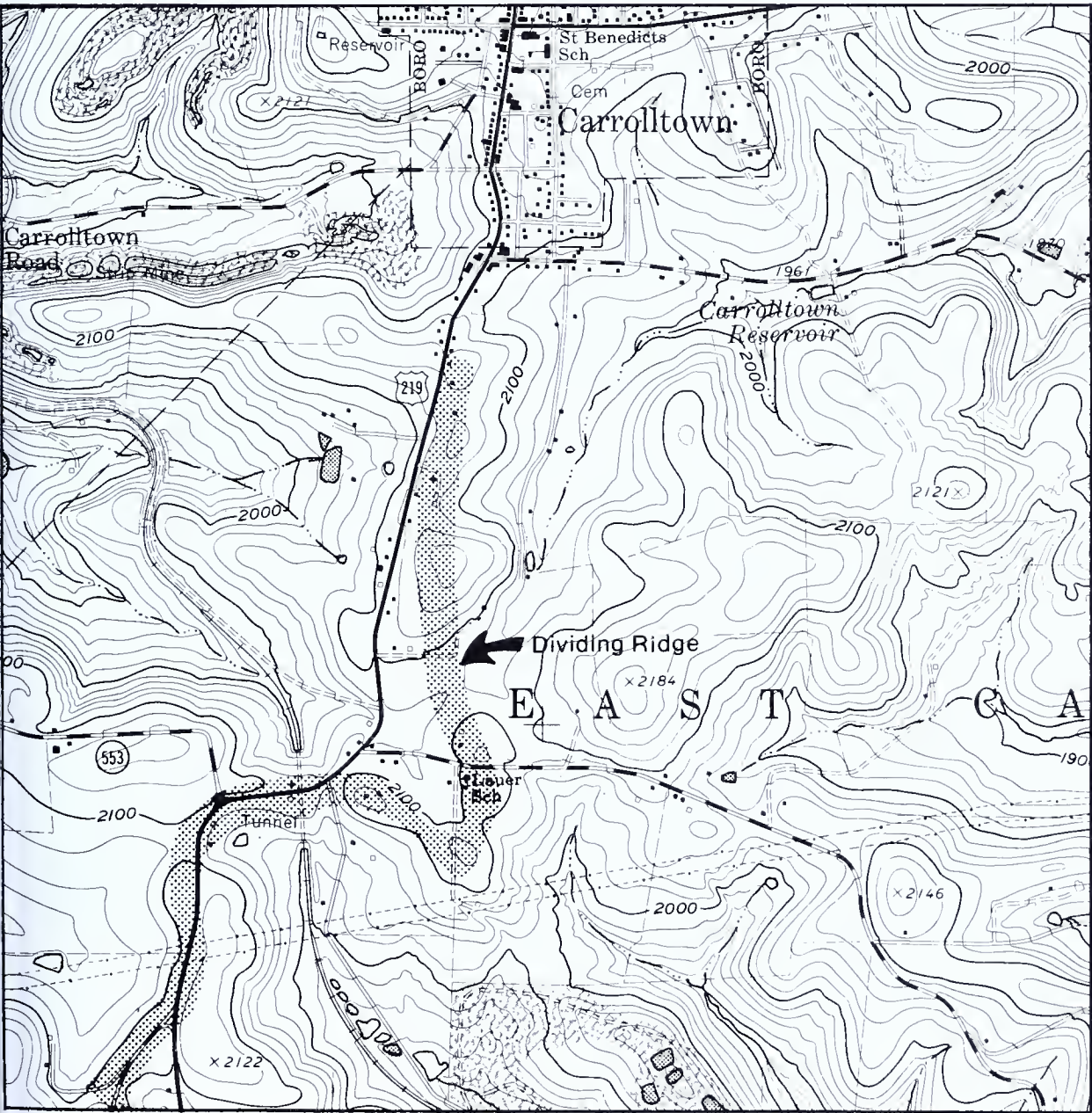
COUNTY: Cambria

TOWNSHIP: East Carroll

QUADRANGLE: Carrolltown

LOCATION: Along U. S. Route 219 south of Carrolltown.

REMARKS: Intracontinental divide; part of the precipitation falling on this hilltop flows to the Atlantic Ocean, the other part to the Gulf of Mexico.



121. ELK ROCK

COUNTY: Fayette

TOWNSHIP: Dunbar

QUADRANGLE: South Connellsville

LOCATION: About 4.2 miles southeast of Dunbar, near the south rim of the gorge of the Youghiogheny River; within State Game Lands No. 51.

REMARKS: Large erosional remnants of a yellowish friable sandstone (Allegheny Group, Pennsylvanian age) are present here near the axis of the Chestnut Ridge anticline. In 1876, Franklin Platt wrote (p. 5 in reference below): "It [Elk Rock] will undoubtedly become a place of resort for the lovers of fine scenery." The sketches of Elk Rock were drawn in 1865 by J. Peter Lesley.

Nearby and near the edge of the Youghiogheny River gorge is a flat rock covered with Indian sculpture and known as **Cow Rock** (122).

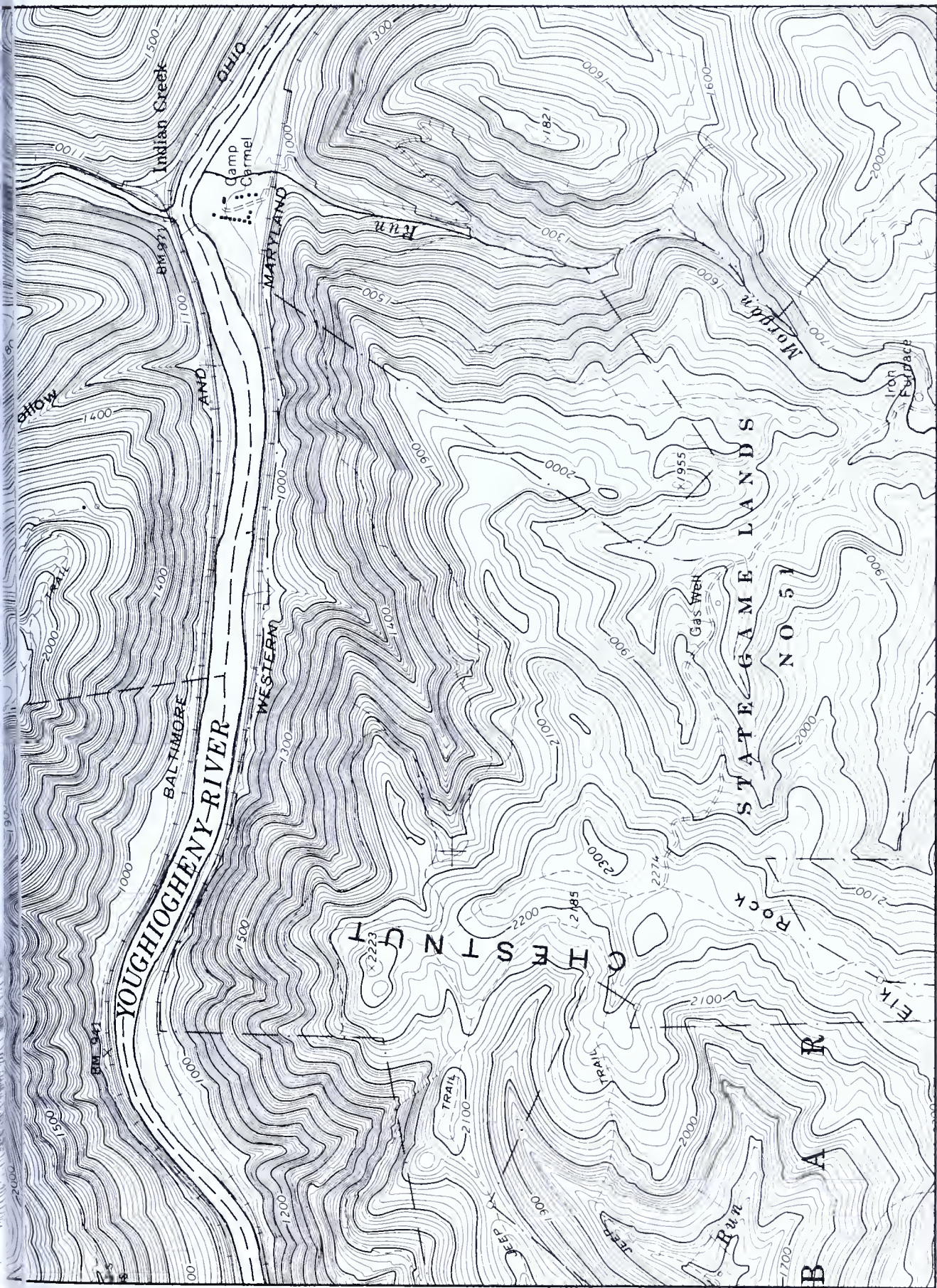
REFERENCE: Platt, Franklin (1876), *Special report on the coke manufacture of the Youghiogheny River valley in Fayette and Westmoreland Counties*, Pennsylvania Geological Survey, 2nd ser., v. L, p. 4-6.



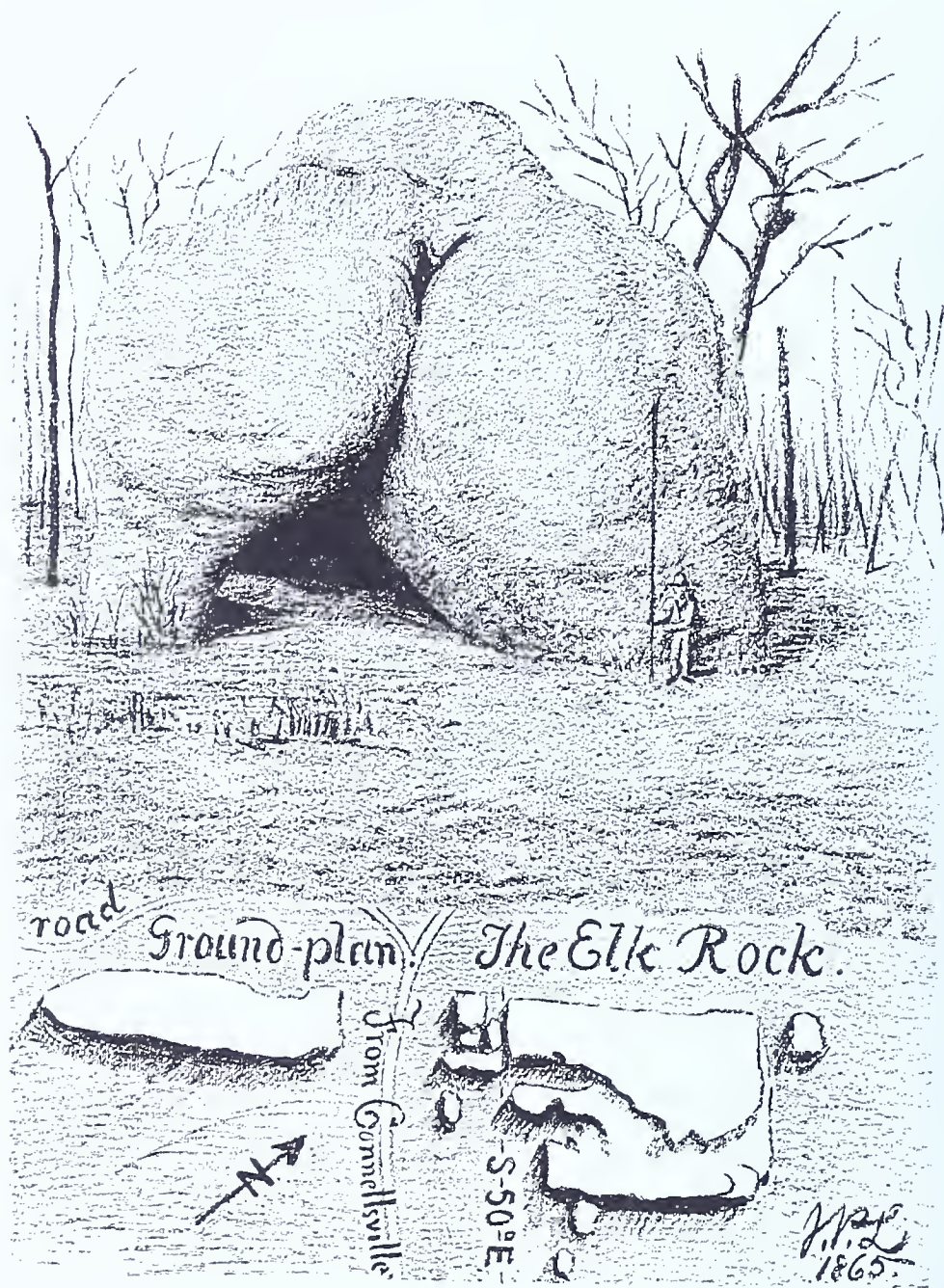
The Elk Rock (Piedmont Sandstone) on Chestnut Ridge over Connellsville
(From reference cited above, facing p. 6)

APPALACHIAN PLATEAUS PROVINCE

ALLEGHENY MOUNTAIN SECTION



121. ELK ROCK (continued)



(From reference cited above, facing p. 4)

APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY MOUNTAIN SECTION



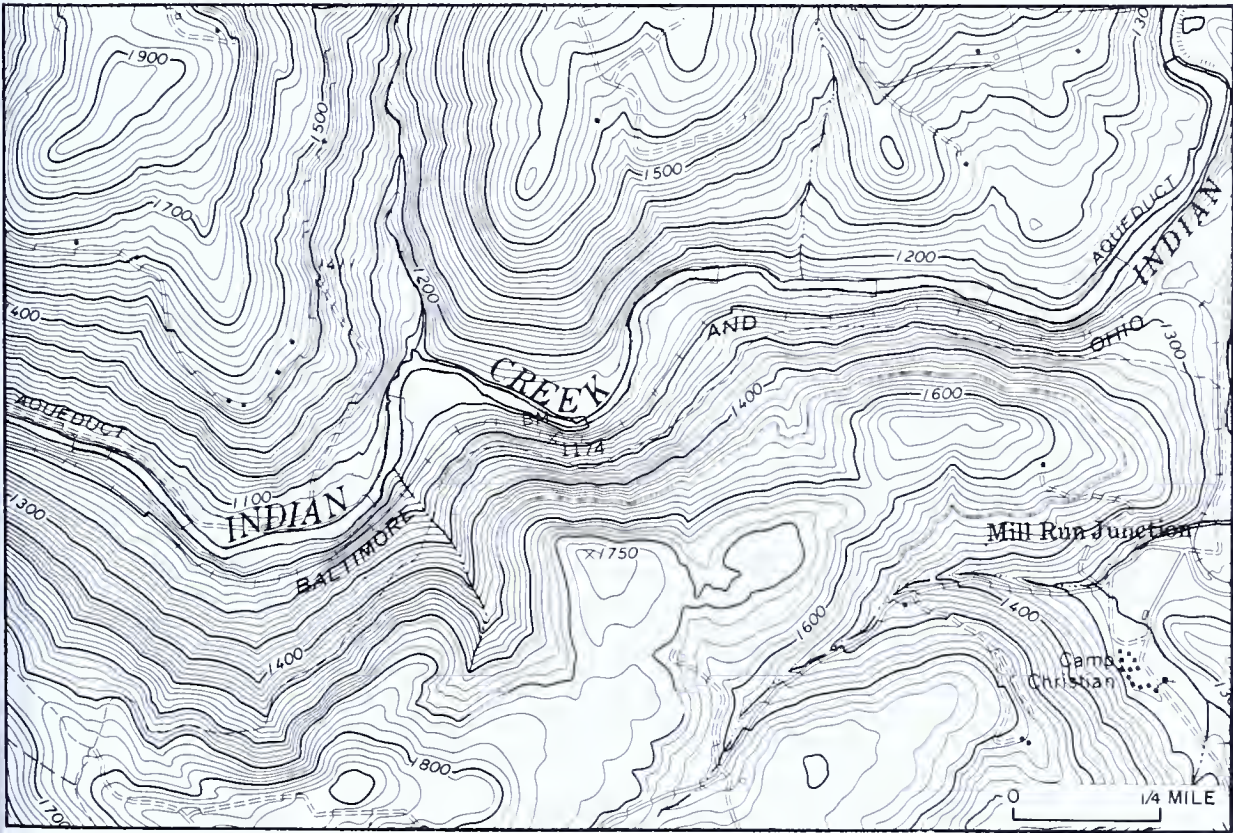
123. INDIAN CREEK GORGE

COUNTY: Fayette TOWNSHIP: Springfield

QUADRANGLE: Mill Run

LOCATION: Two and two-tenths miles northwest of the village of Mill Run, from the intersection of Pa. Route 381 and Indian Creek to the Youghiogheny River.

REMARKS: Indian Creek flows through a steep scenic gorge that exposes sandstones, shales, and siltstones of the Allegheny Group (Pennsylvanian age) to the Catskill Formation (Devonian age).



124. JUMONVILLE ROCKS (WASHINGTONS ROCKS)

COUNTY: Fayette

TOWNSHIP: North Union

QUADRANGLE: Brownfield

LOCATION: Near the crest of Chestnut Ridge about 2.5 miles north of the village of Summit.

REMARKS: The rocks were named after the then Lieutenant Colonel George Washington, in command of a company of Virginia militia, who, with the help of friendly Indians, surprised, killed, wounded, or captured the entire French force of Ensign Jumonville.

The rocks are large outcrops of medium-grained sandstone, calcareous sandstone showing crossbedding, and some scattered conglomeratic zones. The outcrops are part of the Loyalhanna Limestone Member of the Mauch Chunk Formation and Burgoon Sandstone of Mississippian age.

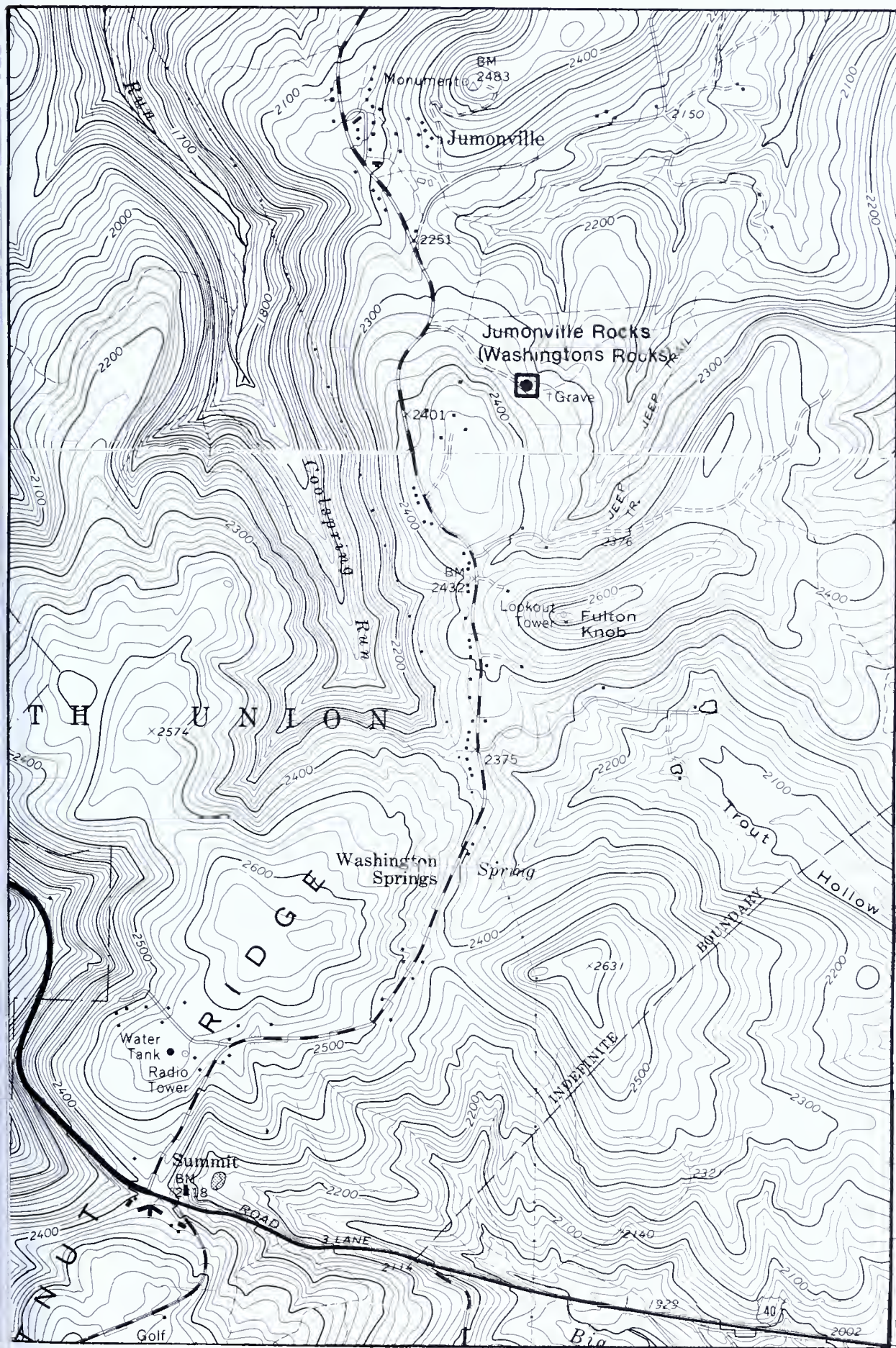
Fulton Knob (125), nearby, is underlain by sandstones of the Pottsville Group.

Washington Springs (126), also named after George Washington, is flowing from the Loyalhanna Limestone.



APPALACHIAN PLATEAUS PROVINCE

ALLEGHENY MOUNTAIN SECTION



FARMINGTON (PA. 381) 4.2 M.
CUMBERLAND, MD. 5.5 M.

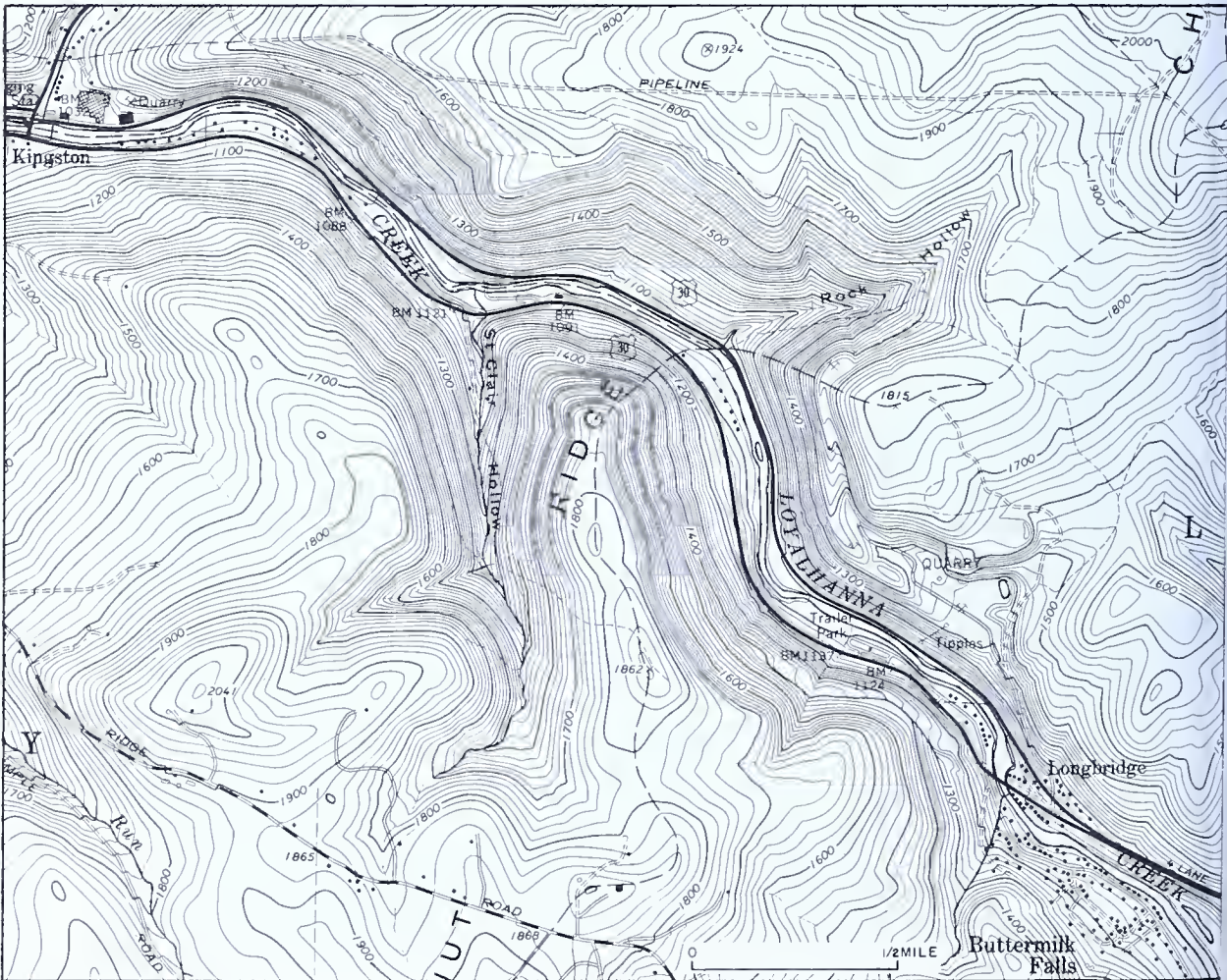
127. LOYALHANNA GORGE

COUNTY: Westmoreland TOWNSHIPS: Ligonier and Unity

QUADRANGLE: Derry

LOCATION: Three miles southeast of Latrobe; U. S. Route 30 parallels Loyalhanna Creek in the gorge.

REMARKS: A 3-mile-long gorge cut by Loyalhanna Creek through Chestnut Ridge; elevations range from 1040 feet at stream level to above 1900 feet on the rim. The river gradient drops about 100 feet in 3 miles and there are sections of boulder-



APPALACHIAN PLATEAUS PROVINCE

ALLEGHENY MOUNTAIN SECTION



stream rapids (**Buttermilk Falls** (128) is the largest and most spectacular).

The topographic crest of the gorge (Chestnut Ridge) corresponds almost exactly in position to the axis of the Chestnut Ridge anticline. Massive sandstones of the Pottsville Group (Pennsylvanian age) form the rim, whereas softer, sandy shales of the Oswayo Formation (Devonian age) are exposed at the base. The geologic record of hundreds of millions of years is recorded in the rocks in this gorge.

REFERENCE: Campbell, M. R. (1904), *Latrobe, Pa.*, U. S. Geological Survey Atlas, Folio 110, 15 p.

NOTES:

129. MOUNT DAVIS

COUNTY: Somerset

TOWNSHIP: Elk Lick

QUADRANGLE: Markleton

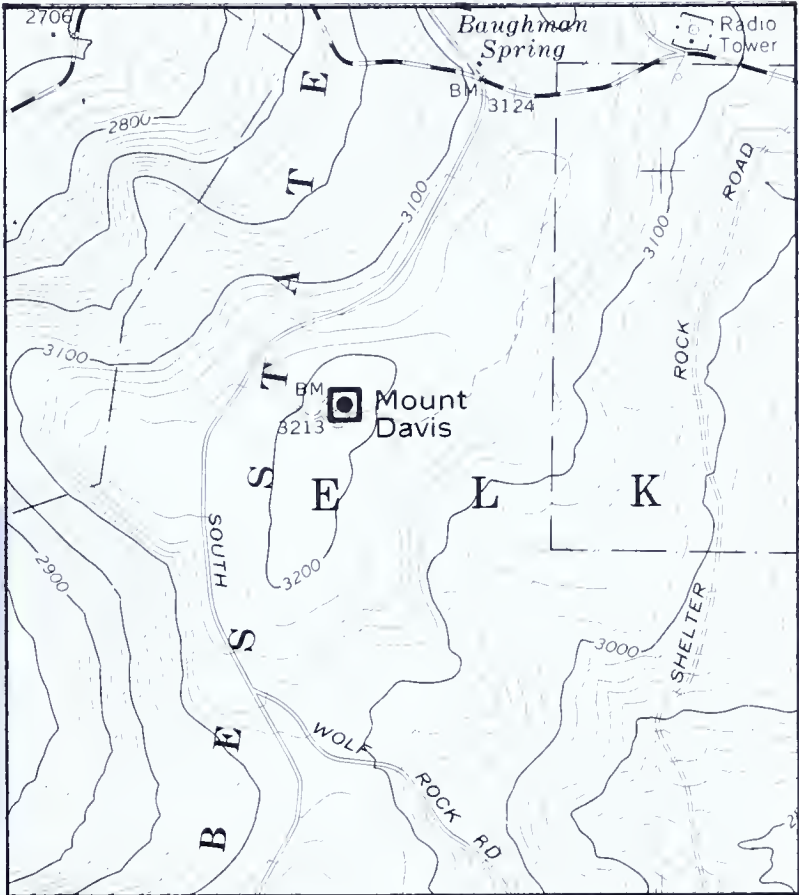
LOCATION: Eight miles west of Meyersdale via Summit Mills.

REMARKS: Mt. Davis, 3213 feet above sea level, is the highest point in Pennsylvania. Erosion-resistant sandstone at the surface is part of the Pottsville Group, formed about 230 million years ago (Pennsylvanian age). Layers of sedimentary rock were pushed up as an upfold 200 million years ago during the upheaval called the Appalachian Revolution. Negro Mountain and the surrounding plateau may be seen atop a 40-foot observation tower.

REFERENCE: Pennsylvania Department of Internal Affairs (1936), *Mt. Davis, 3,213 feet above level of sea, is state's highest peak*, Monthly Bulletin, v. 1, no. 5, p. 16-22.



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY MOUNTAIN SECTION



PA 669



A GEOLOGIC FEATURE

MT. DAVIS

MT. DAVIS 3213 FEET ABOVE SEA LEVEL IS THE HIGHEST POINT IN PENNSYLVANIA. THE EROSION REMNANT SANDSTONE AT THE SURFACE BELONGS TO THE POTTSVILLE GROUP FORMED ABOUT 230 MILLION YEARS AGO. THESE LAYERS OF SEDIMENTARY ROCK WERE PUSHED UP AS AN UPFOLD 200 MILLION YEARS AGO DURING THE UPHEAVAL CALLED THE APPALACHIAN REVOLUTION.

130. 90-FOOT ROCKS

COUNTY: Westmoreland

TOWNSHIP: Cook

QUADRANGLE: Ligonier

LOCATION: Within the gorge of Linn Run; adjacent to Linn Run State Park; 6 miles south of the Borough of Ligonier; on the west flank of Laurel Hill.

REMARKS: Outcrops of sandstone of the Allegheny Group (Pennsylvanian age) form a cliff at this site; the view of Linn Run gorge and the Ligonier highlands is excellent. Nearby in the gorge, **Adams Falls** (131), **Grove Run Spring** (132), **Flat Rock** (133), and **Wolf Rocks** (134) are notable geologic features. Sandstones of the Pottsville Group (Pennsylvanian age) form **Wolf Rocks**; examples of joint blocks, frost wedging, and exfoliation are common along the trail to, and at, this site; a scenic overlook similar to that at 90-Foot Rocks is present.

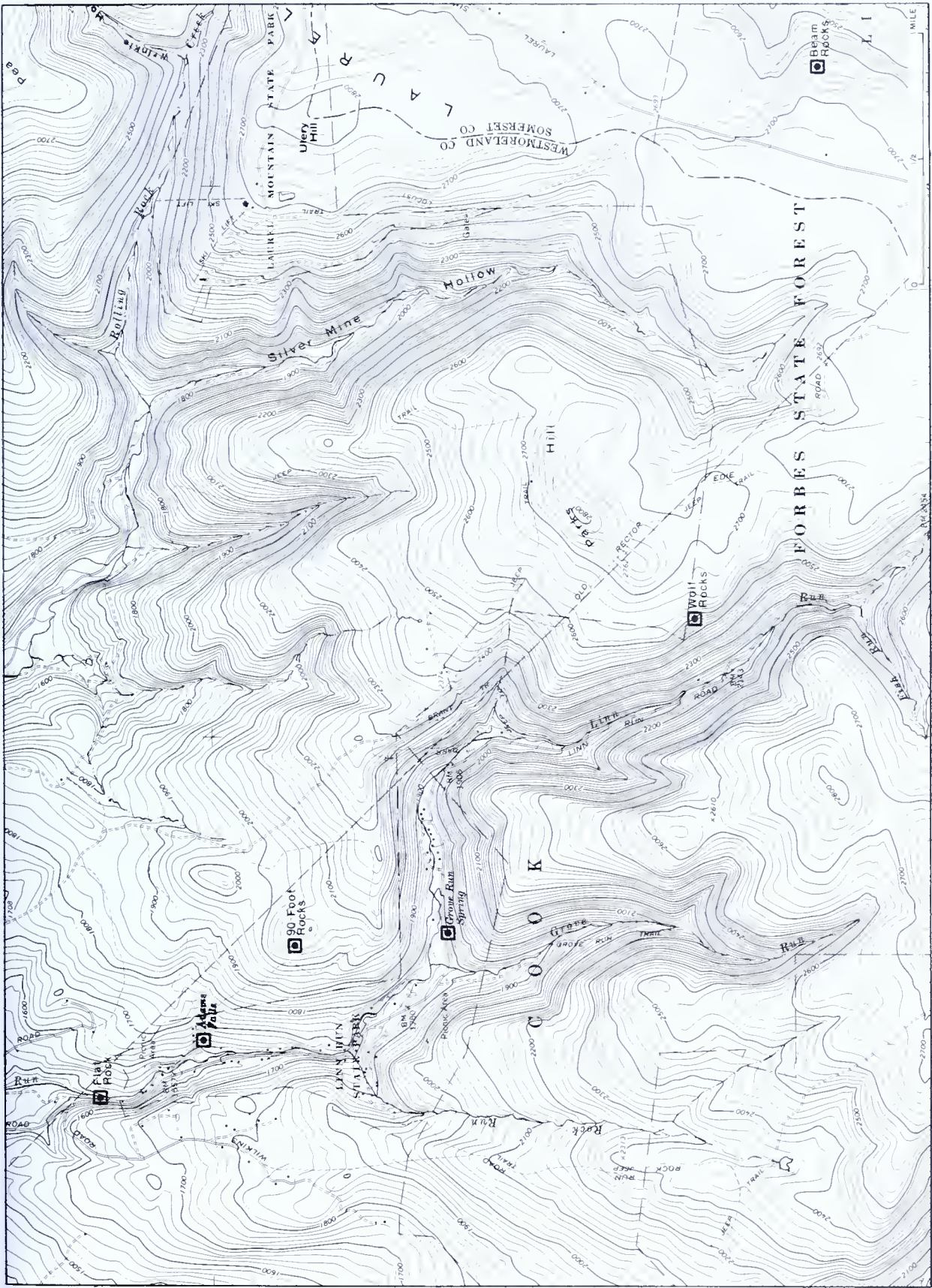
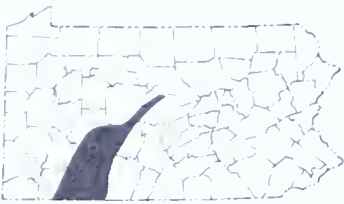
A little more than 2 miles east of Wolf Rocks and about 2000 feet east of Laurel Summit Road, **Beam Rocks** (135) (Somerset County, Lincoln Township) and vista are very similar to 90-Foot Rocks, geologically and topographically.



FLAT ROCK

APPALACHIAN PLATEAUS PROVINCE

ALLEGHENY MOUNTAIN SECTION



136. OHIOPYLE GORGE

COUNTY: Fayette

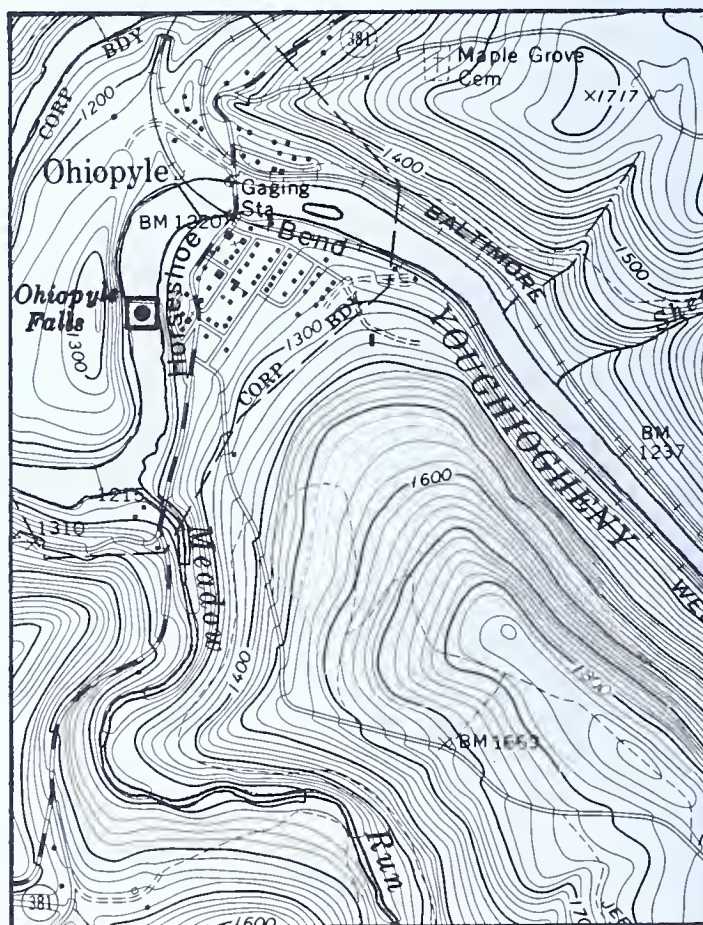
BOROUGH: Ohiopyle

QUADRANGLE: Ohiopyle

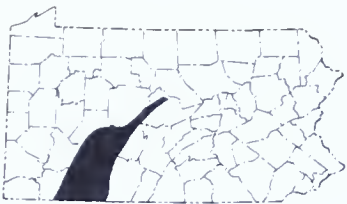
LOCATION: The Youghiogheny River in the Borough of Ohiopyle, and within Ohiopyle State Park.

REMARKS: The Youghiogheny River crosses Laurel Hill in a deep gorge. Rock exposures and the landscape of the gorge reveal a geologic history of sedimentation, deformation, and erosion that is typical of the Allegheny Mountain section. **Ohiopyle Falls** (137) is especially noteworthy in that falls of this magnitude are rare in southwestern Pennsylvania. To the east in Henry Clay Township, **Horseshoe Bend** (138) is a large meander in the river.

REFERENCE: Bushnell, Kent (1970), *Ohiopyle State Park: Geologic features of interest*, Pennsylvania Geological Survey, 4th ser., Park Guide 7.



APPALACHIAN PLATEAUS PROVINCE
ALLEGHENY MOUNTAIN SECTION



OHIOPYLE FALLS

139. SEVEN-COUNTY SCENIC VIEW

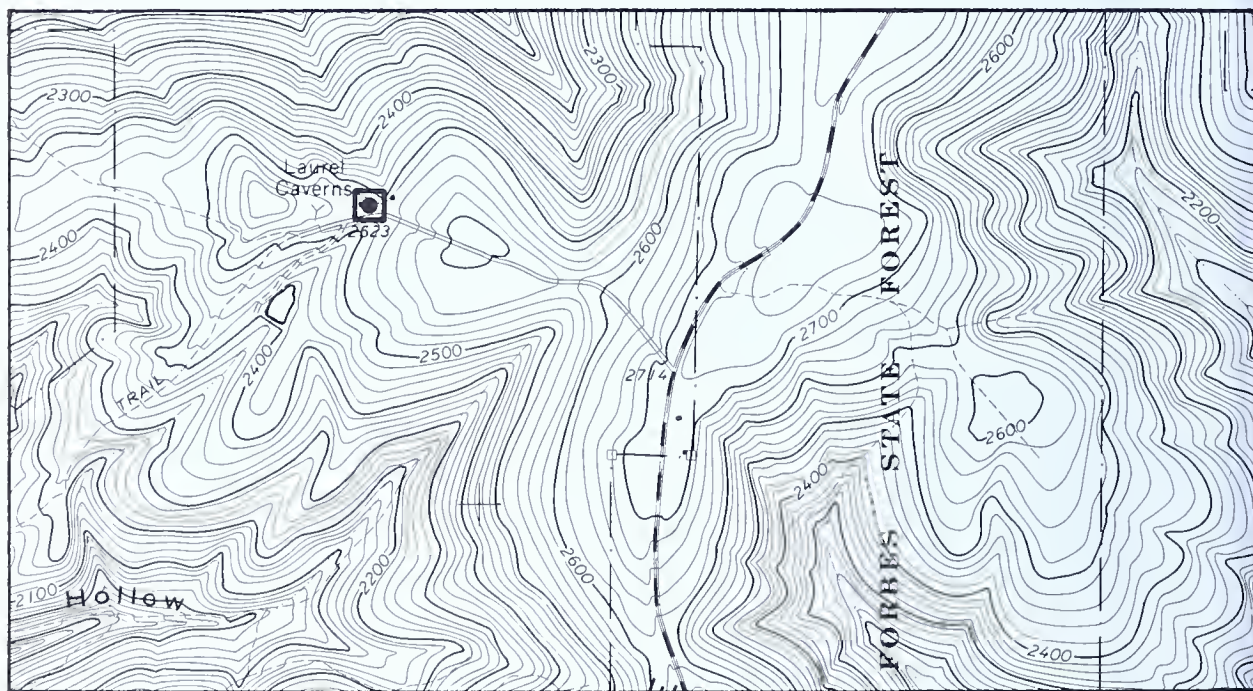
COUNTY: Fayette

TOWNSHIP: Georges

QUADRANGLE: Brownfield

LOCATION: Approximately 2.5 miles east of the village of Fairchance; in the parking lot of Laurel Caverns.

REMARKS: The Seven-County Scenic View is spectacular—on a clear day, you can see the U. S. Steel Building in Pittsburgh, 45 air miles away. Outcrops of Pottsville sandstone (Pennsylvanian age) occur in massive blocks on this west slope of Chestnut Ridge. **White Rocks** (140) is a popular climbing area nearby.



APPALACHIAN PLATEAUS PROVINCE

ALLEGHENY MOUNTAIN SECTION



141. SUNCLIFF

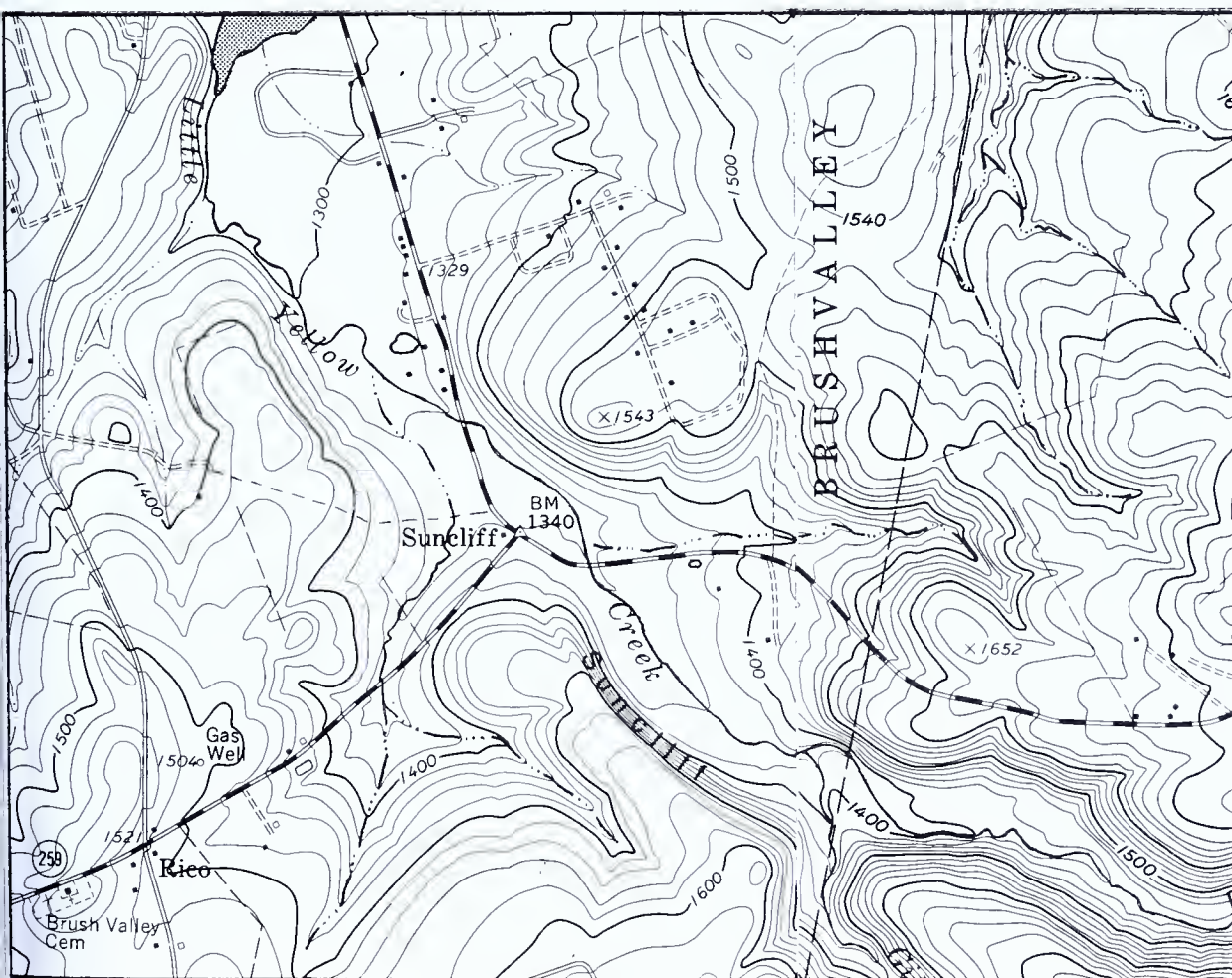
COUNTY: Indiana

TOWNSHIP: Brush Valley

QUADRANGLE: Brush Valley

LOCATION: Immediately south of the village of Suncliff; 3.4 miles east of the village of Brush Valley; near the junction of U. S. Route 422 and Pa. Route 259.

REMARKS: A 100- to 200-foot cliff of alternating shale, sandstone, limestone, minor coals, and clay of the Casselman and Glenshaw Formations (Conemaugh Group, Pennsylvanian age); the rock exposure is on the eastern limb of the Brush Valley syncline.



142. WOLF ROCKS

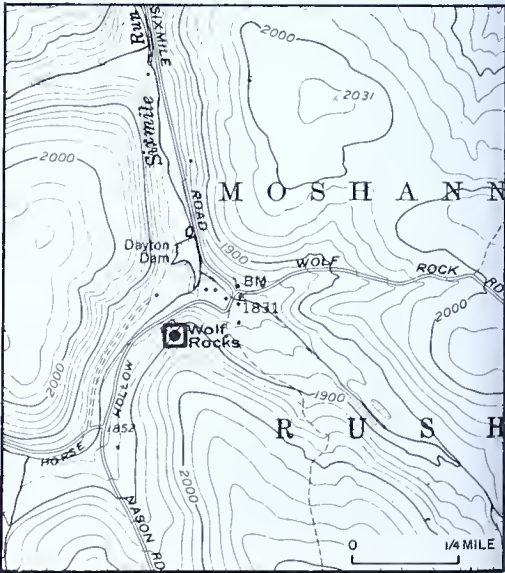
COUNTY: Centre

TOWNSHIP: Rush

QUADRANGLE: Port Matilda

LOCATION: About 5.3 miles northwest of the Borough of Port Matilda; within Moshannon State Forest.

REMARKS: Large outcrops of greenish calcareous sandstone of the Mauch Chunk Formation (Mississippian age) on a bend of Horse Hollow Road. The calcareous sandstone in the Mauch Chunk marks the horizon of the Loyalhanna Member of the formation.





143. WOPSONONOCK LOOKOUT

COUNTY: Blair

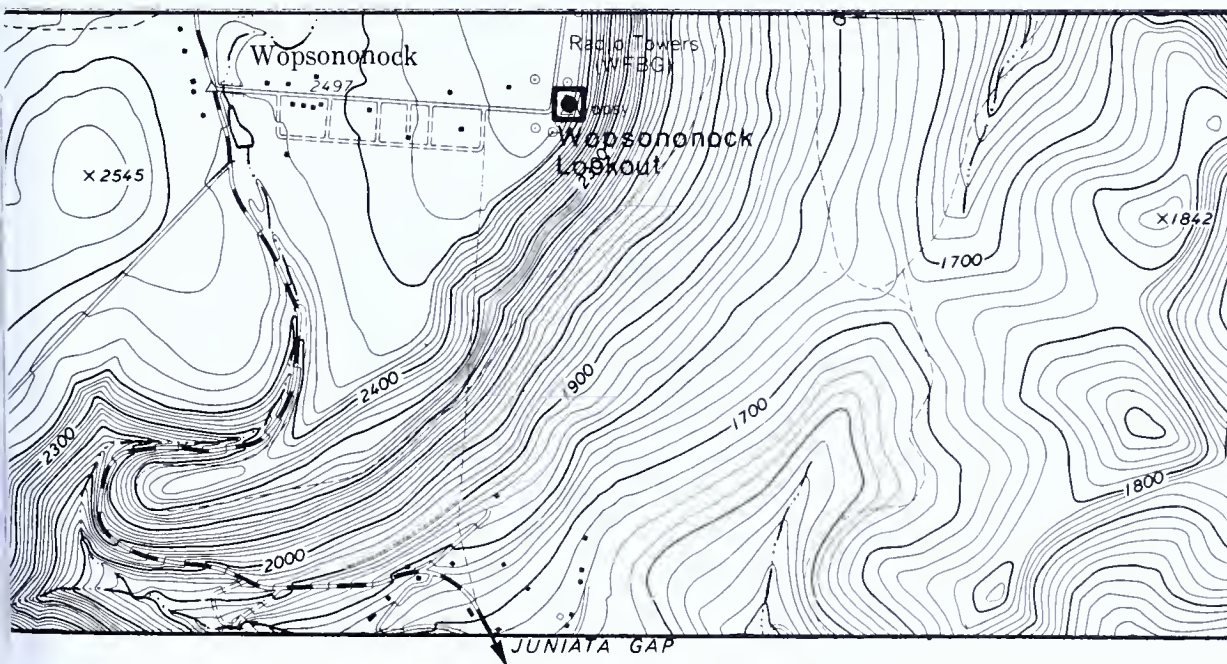
TOWNSHIP: Logan

QUADRANGLE: Altoona

LOCATION: Six miles west of Altoona.

REMARKS: Excellent view from the Allegheny Front of the Valley and Ridge province to the east, Altoona, and a six-county area; the elevation is 2580 feet above sea level. The bedrock beneath the rim of the Allegheny Front here is the hard, tough Burgoon Sandstone (Mississippian age) which, due to its weather-resistant qualities, causes the great difference in elevation between the limestone valley and this site.

REFERENCE: Glover, A. D., and Faill, R. T. (in preparation), *Geology and mineral resources of the Altoona 15-minute quadrangle, Blair, Cambria, Clearfield, and Centre Counties, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Atlas 86.



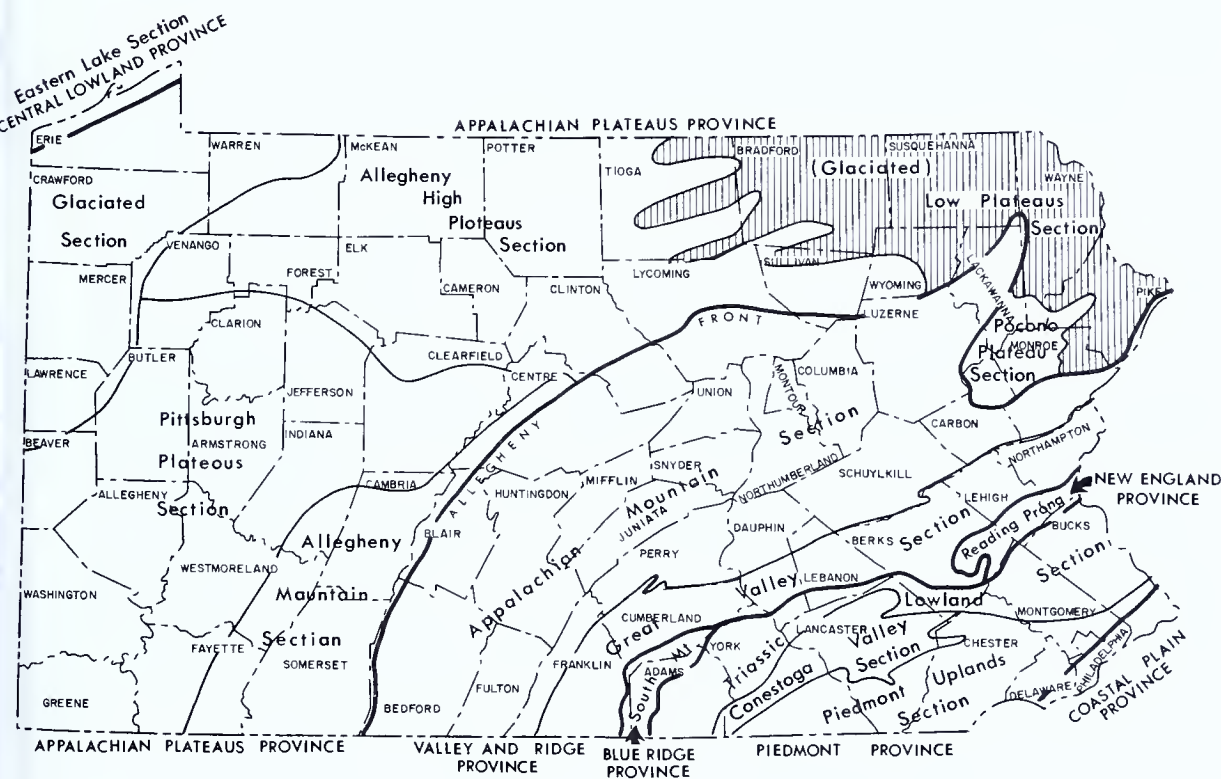
143. WOPSONONOCK LOOKOUT *(continued)*



APPALACHIAN PLATEAUS PROVINCE— GLACIATED LOW PLATEAUS SECTION

TOPOGRAPHY

The Glaciated Low Plateaus section, as the name implies, is a glaciated plateau of moderate relief, and is located in the extreme northeastern corner of the state. The area is one of smooth, rolling hills and a large number of glacial lakes and swamps. The western area of the section slopes gently toward the Susquehanna River, whereas the eastern part slopes toward the Delaware River. The number of streams increases from west to east across the section, and some of the streams found east of the Susquehanna River have eroded deep valleys in the plateau. Elevations range from 2100 feet in western Wayne County to as low as 500 feet along the Delaware River in Pike County.



ROCK COLUMN

Glacial till and outwash deposits are found along streambeds and on hillsides. This unconsolidated material, the result of the Wisconsin and the earlier Illinoian glaciation, is composed primarily of unsorted sand and gravel in a matrix of clay; the material has low porosity and low permeability. Where these glacial deposits are thick and sorted there are stratified lenses of sand and/or gravel having a uniform grain size.

OUTSTANDING SCENIC GEOLOGICAL FEATURES OF PENNSYLVANIA

The most abundant rock type throughout the area is sandstone, and only in the Lock Haven Formation is shale the dominant rock type.

A description of the rock units present is as follows:

SYSTEM	ROCK UNIT	DESCRIPTION
Quaternary Pennsylvanian	Wisconsinan drift	Sand and gravel.
	Allegheny Group	Sandstone, shale, clay, and coal.
	Pottsville Group	Gray sandstone and conglomerate and interbeds of shale and coal.
Mississippian	Mauch Chunk Formation	Red and green shale and sandstone
	Pocono Formation	Gray sandstone and conglomerate
Mississippian and Devonian	Spechty Kopf Formation	Light- to olive-gray, fine- to medium-grained, crossbedded sandstone, siltstone, and pebbly mudstone in fining-upward cycles; local conglomerate.
Devonian	Catskill Formation	Red to brown sandstone and shale.
	Lock Haven Formation	Gray shale, sandy shale, and sandstone
	Trimmers Rock Formation	Olive-gray siltstone and silty shales; very fine grained sandstones locally.

ROCK STRUCTURE

Four anticlines form the major structural features of the section. The axes of these anticlines trend 40-50°E and they have a shallow plunge that results in the termination of their surface expression and the exposure of successively younger formations. Three of the anticlines extend across Tioga County and the fourth extends into Sullivan County.

The primary folded structures, from north to south across Tioga and Bradford Counties, are the: 1) Wellsboro anticline, 2) Windham syncline, 3) Rome anticline, 4) Blossburg syncline, 5) Towanda anticline, 6) Barclay syncline, and 7) Wilmot anticline. All of the folds disappear to the east and the rocks become nearly horizontal.

Surface evidence of major faulting is lacking; however, faulting on a local scale is present in Bradford County. The few faults that are seen are parallel to the anticlines.

APPALACHIAN PLATEAUS PROVINCE
GLACIATED LOW PLATEAUS SECTION



144. BUCK HILL FALLS

COUNTY: Monroe

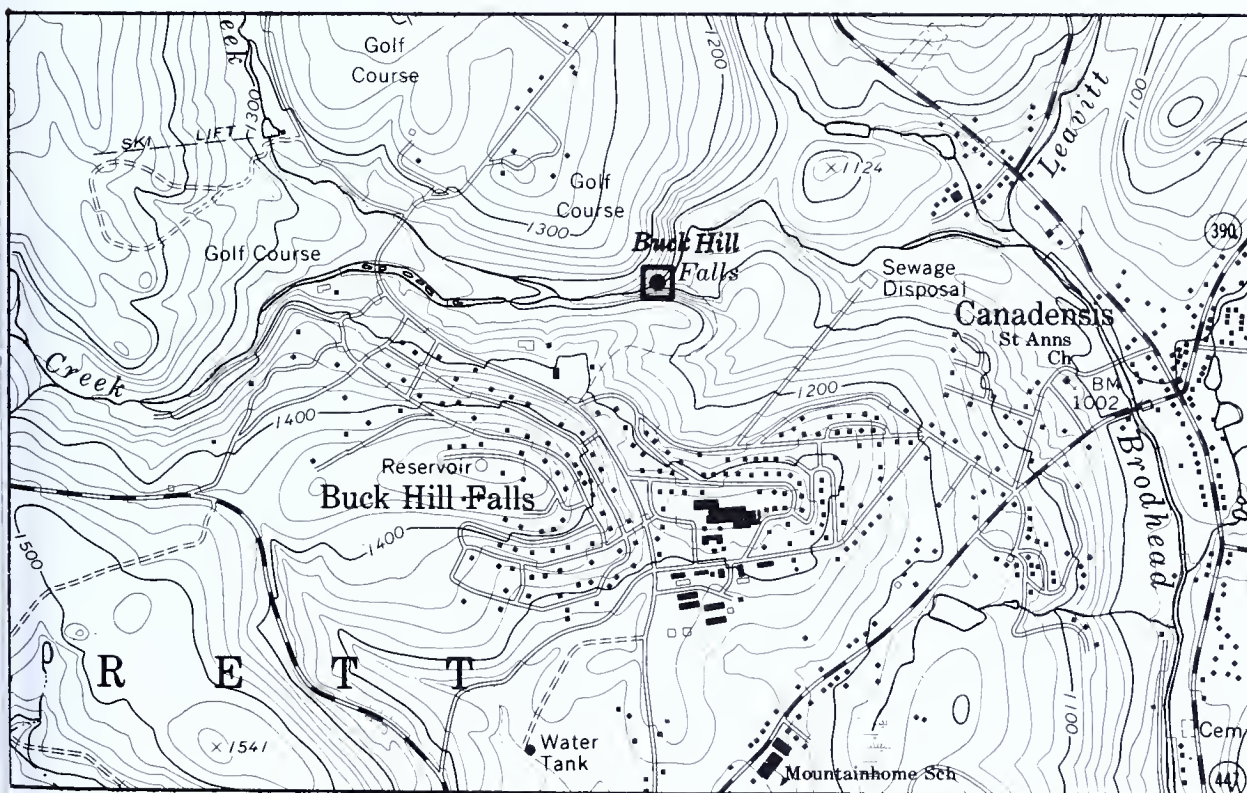
TOWNSHIP: Barrett

QUADRANGLE: Buck Hill Falls

LOCATION: One-half mile north of Buck Hill Falls Borough.

REMARKS: Scenic waterfalls over sandstones and siltstones of the Catskill Formation (Long Run Member, Late Devonian age); the height, size, and beauty of the waterfalls place them among the most spectacular in the state.

REFERENCE: Sevon, W. D. (1975), *Geology and mineral resources of the Tobyhanna and Buck Hill Falls quadrangles, Monroe County, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Atlas 204ab.



145. CENTERFIELD CORAL REEF

COUNTY: Monroe

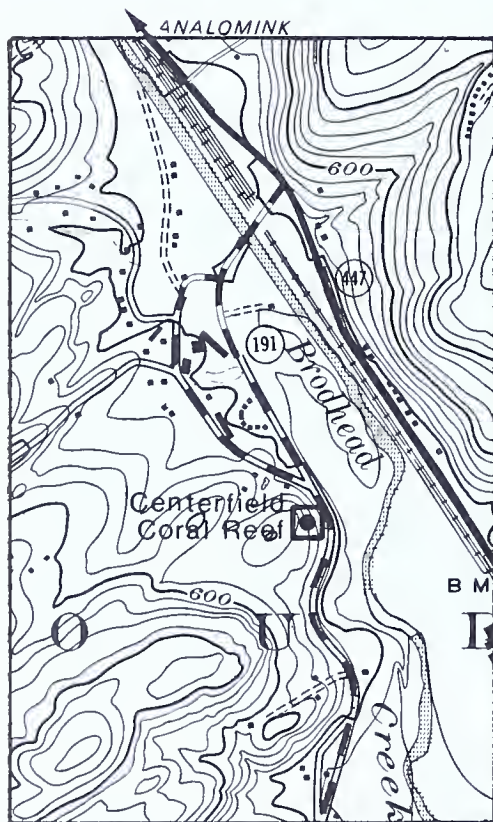
TOWNSHIP: Stroud

QUADRANGLE: East Stroudsburg

LOCATION: Four miles north of Stroudsburg along Pa. Route 191. PRIVATE PROPERTY, NO TRESPASSING.

REMARKS: One of best sites in the state for specimens of fossil horn corals. The rock exposure is part of the Mahantango Formation of Middle Devonian age; fossil materials include coelenterates, bryozoans, brachiopods, and one genus of trilobite.

REFERENCES: Beerbower, J. R., and McDowell, F. W. (1960), *The Centerfield biostrome: An approach to a paleoecologic problem*, Pennsylvania Academy of Science Proceedings, v. 34, p. 84-91.
Bolles, W. H., and Geyer, A. R. (1975), *Pennsylvania Interstate 80—Geologic guide*, Pennsylvania Department of Education, p. 25-26.





146. DEVILS PUNCH BOWL

COUNTY: Susquehanna

TOWNSHIP: Harmony

QUADRANGLE: Susquehanna

LOCATION: About 3 miles northeast of the Borough of Susquehanna along an unimproved township road; immediately east of the intersection of Cascade Creek and the Erie-Lackawanna Railroad tracks (Cronlund, C. K., personal communication).

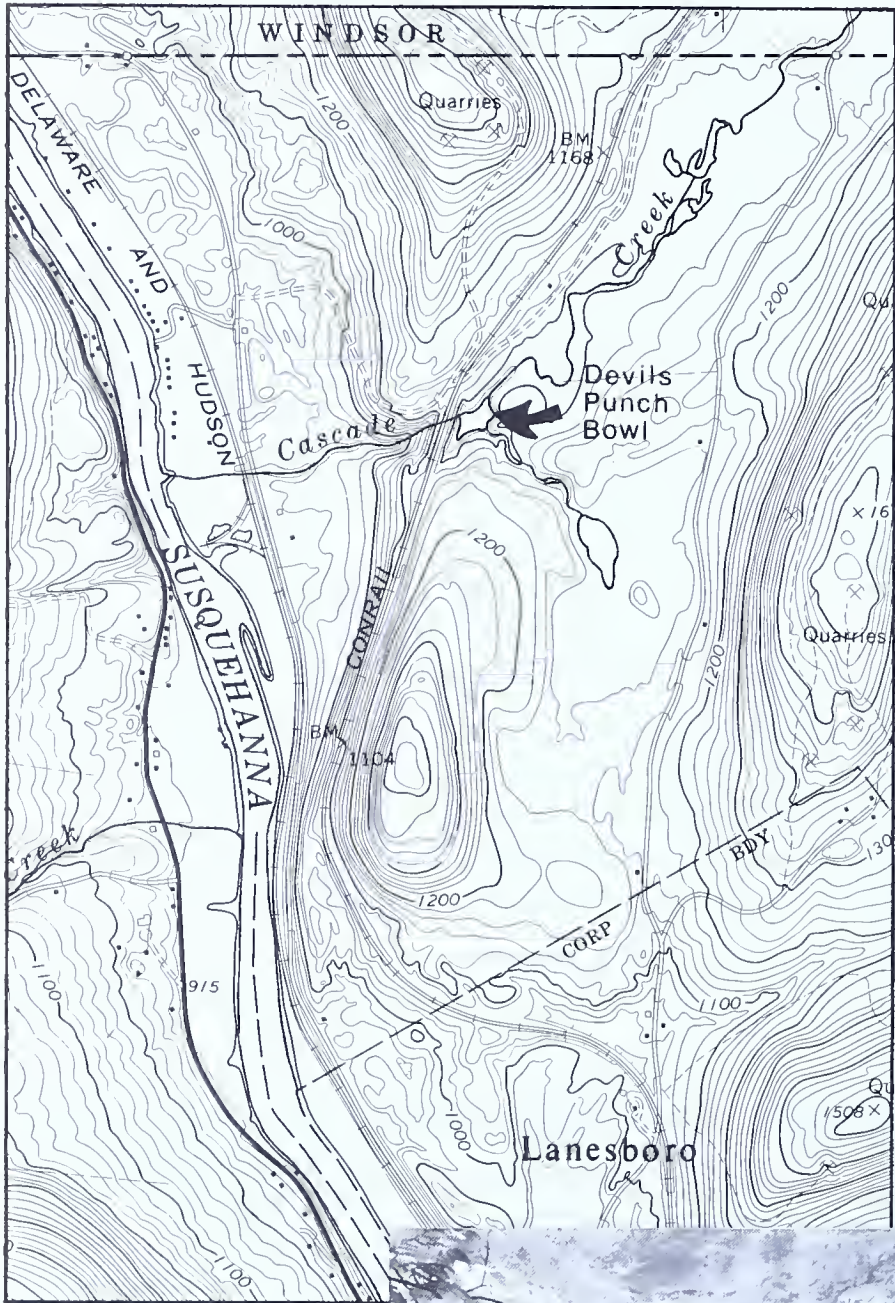
REMARKS: Glacial lakes perched 160 feet above the Susquehanna River on poorly drained sand and gravel deposits drain into this bowl-like "plunge pool." These lakes and "pool" were originally formed by glacial meltwater during late Wisconsinan deglaciation.

The waterfalls tumbling into this bowl-like depression make this a very scenic site.

REFERENCE: Susquehanna Planning Commission (1970), *Inventory of natural, scenic, and historic areas*, Montrose, Pennsylvania, 2 p.



146. DEVILS PUNCH BOWL (continued)



APPALACHIAN PLATEAUS PROVINCE
GLACIATED LOW PLATEAUS SECTION



147. ELEPHANTS FEET

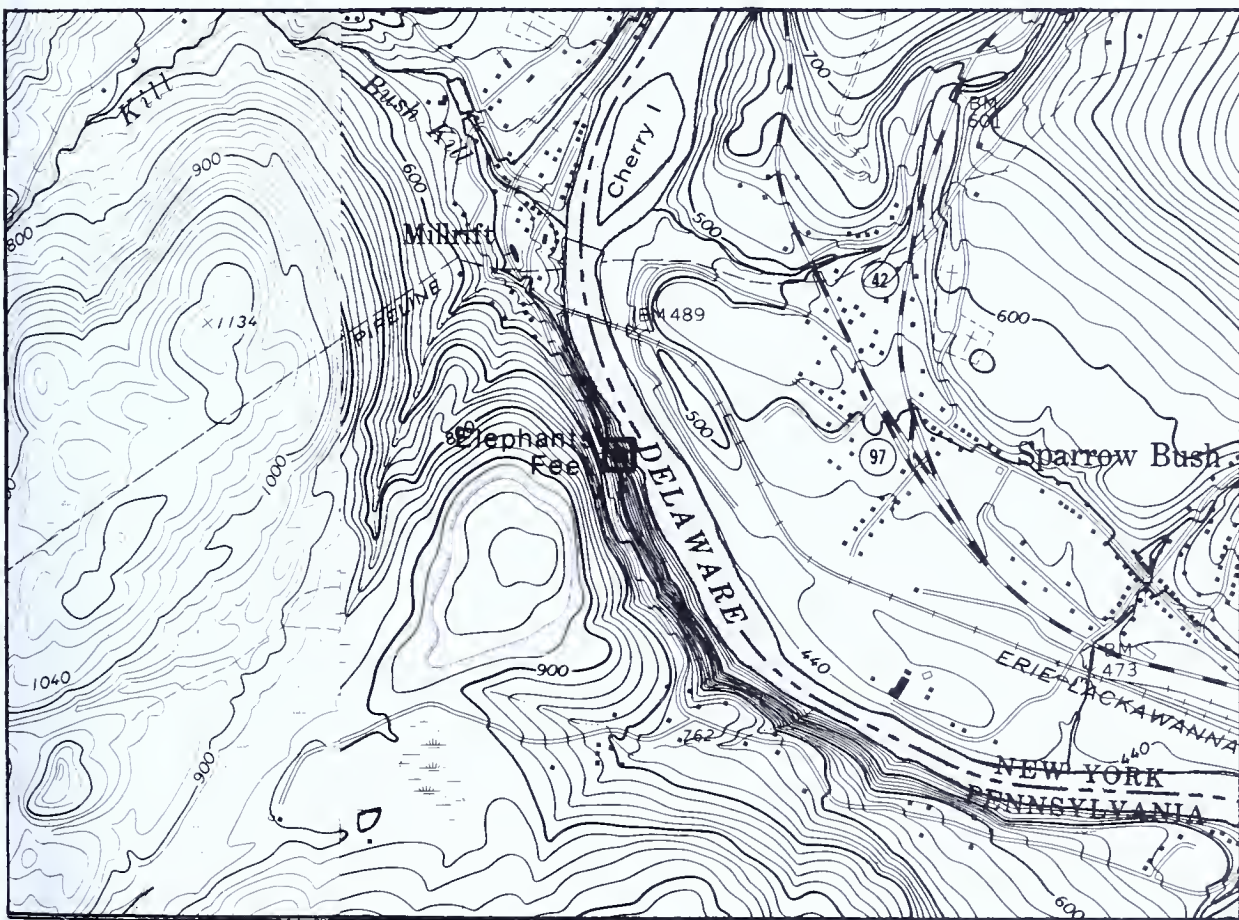
COUNTY: Pike

TOWNSHIP: Westfall

QUADRANGLE: Port Jervis North, New York-Pennsylvania

LOCATION: Two and one-half miles north of the Borough of Matamoras along the Delaware River; 0.5 mile south of the village of Millrift.

REMARKS: Weathering along intersecting vertical fractures has produced tall columns of rock resembling elephants' feet; the sandstones and siltstones are part of the Trimmers Rock Formation (Devonian age).



148. ELK HILL OVERLOOK

COUNTY: Susquehanna

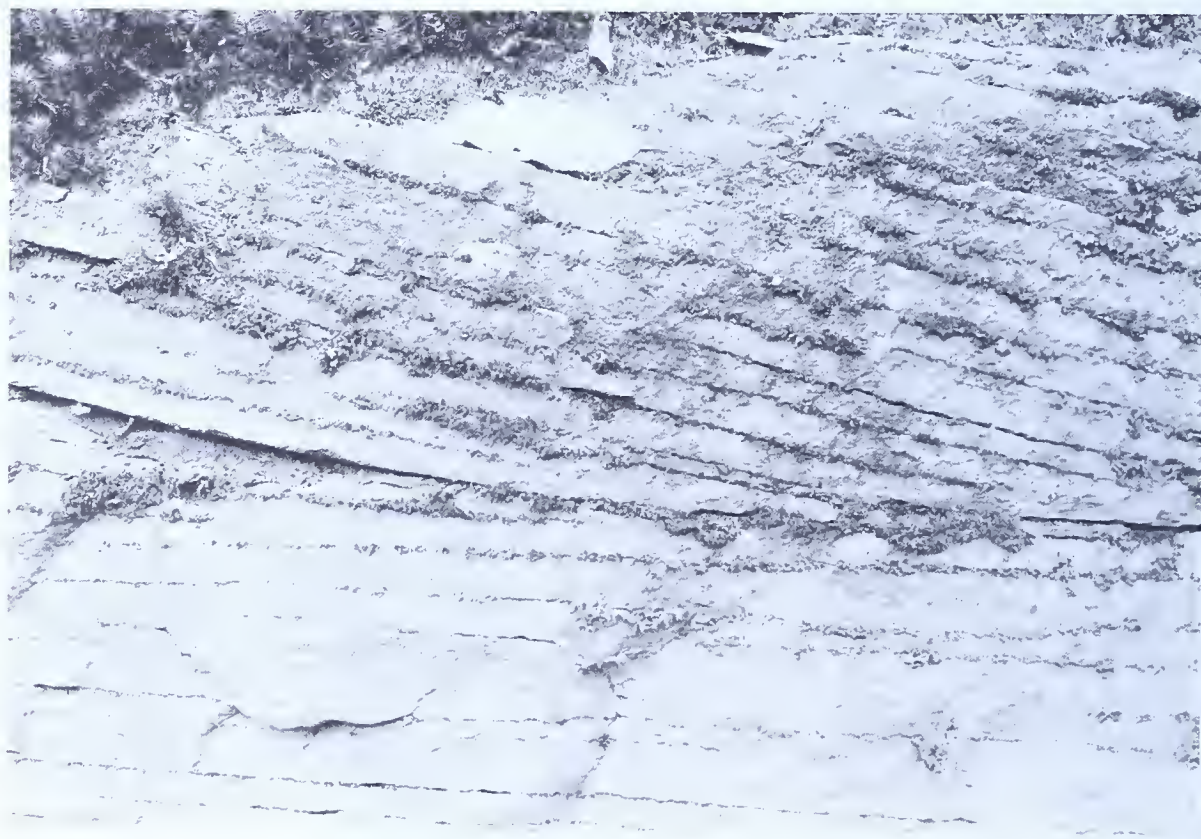
TOWNSHIP: Herrick

QUADRANGLE: Clifford

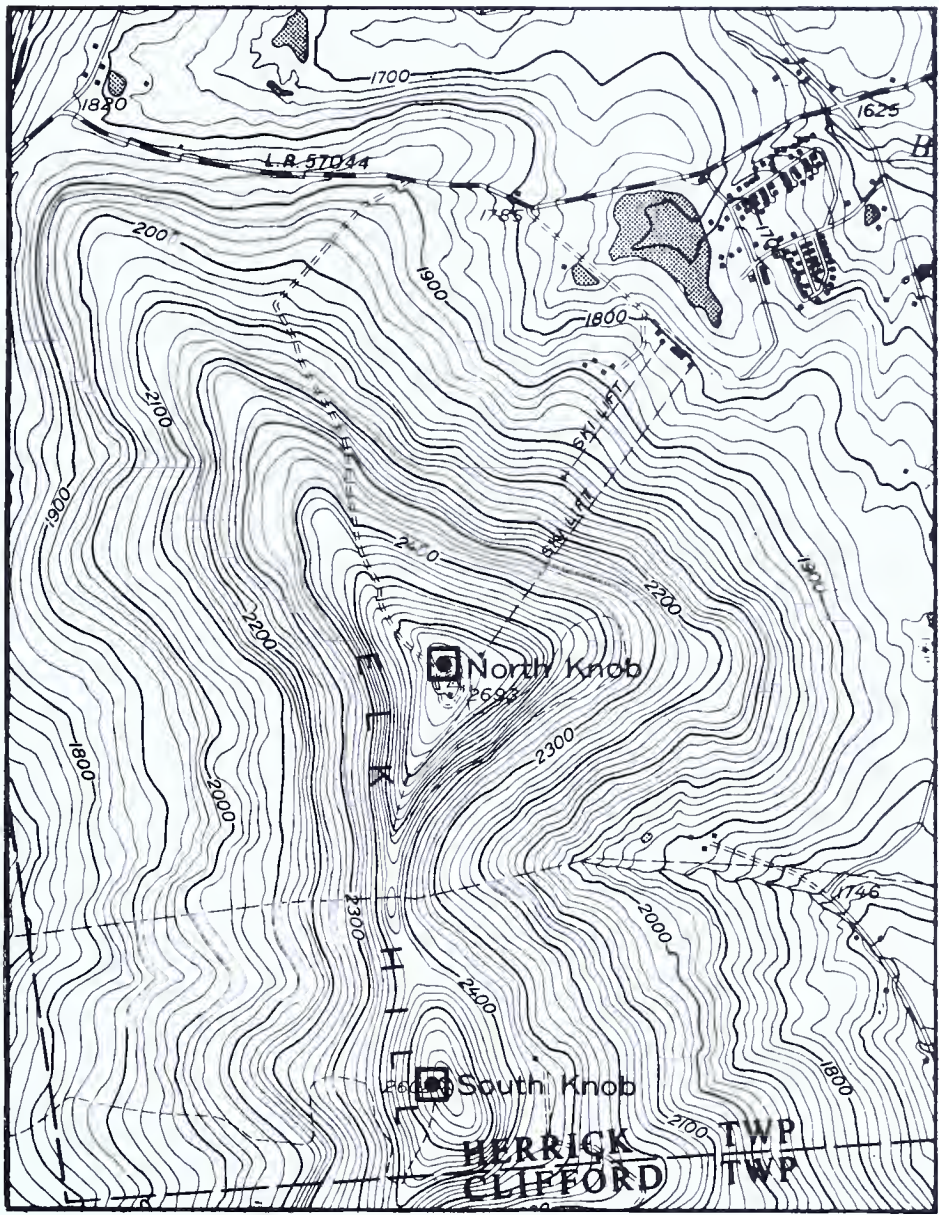
LOCATION: **North Knob** (149) is at the village of Four Seasons. **South Knob** (150) is located immediately to the south.

REMARKS: **North Knob** provides an excellent view of the Low Plateau. Flagstone quarries at the summit show flaggy-bedded sandstones of the Catskill Formation (Devonian age). Stone fence rows are characteristic of the countryside and physiographic section.

REFERENCE: Susquehanna Planning Commission (1970), *Inventory of natural, scenic, and historic areas*, Montrose, Pennsylvania, 2 p.



APPALACHIAN PLATEAUS PROVINCE
GLACIATED LOW PLATEAUS SECTION



NOTES:

151. FRENCH AZILUM OVERLOOK

COUNTY: Bradford

TOWNSHIP: Wyalusing

QUADRANGLE: Wyalusing

LOCATION: Ten miles southeast of Towanda along the Susquehanna River.

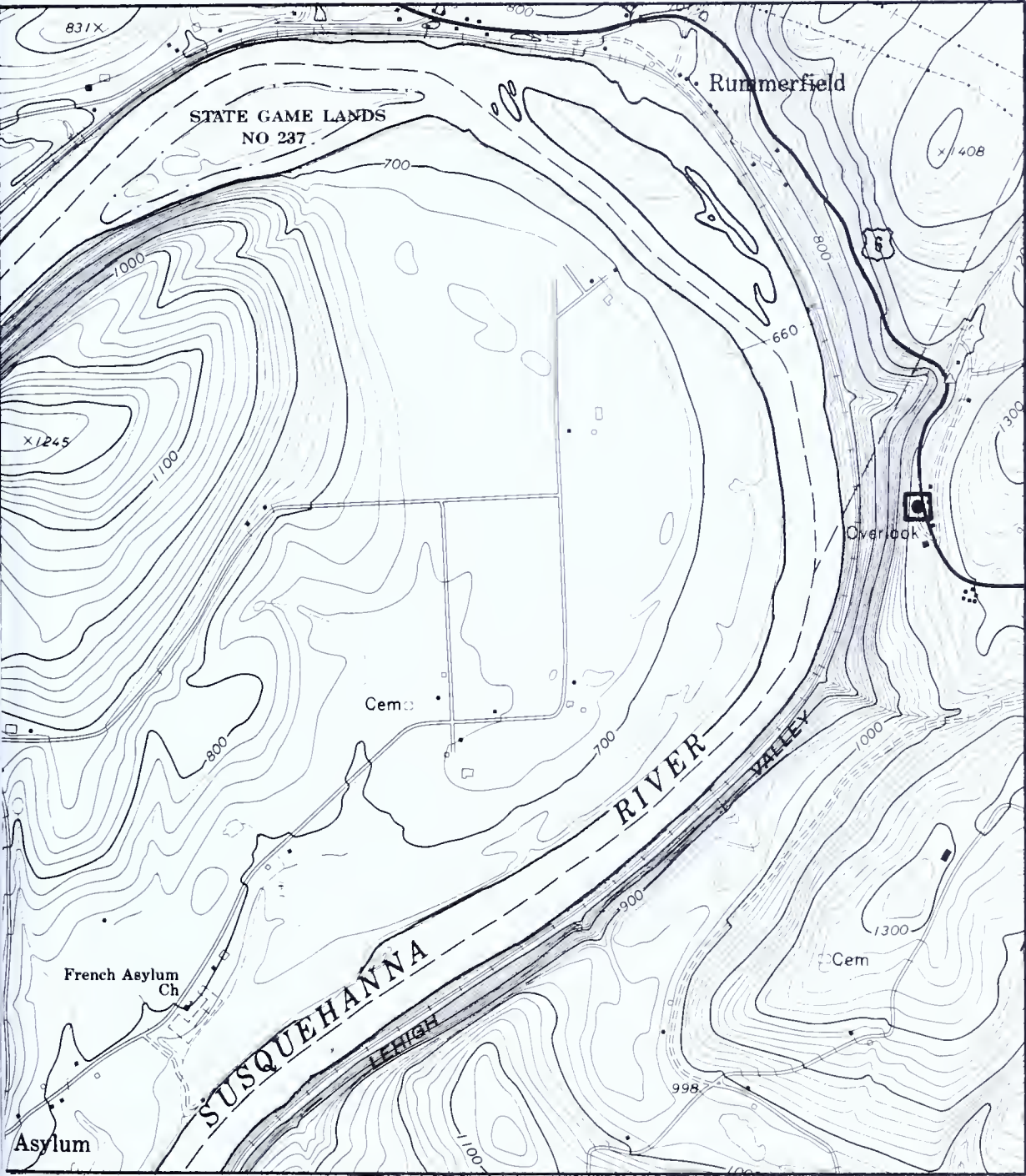
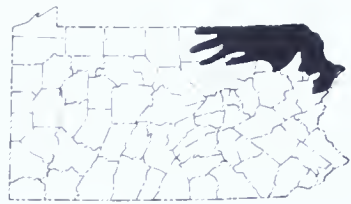
REMARKS: A breathtaking view of a large meander in the Susquehanna River; the site of the colony for refugees from the French Revolution, settled in the autumn of 1793. Marie Antoinette, the queen of France, and her two children were to come to this site.

Quicks Bend (152), 7.5 miles to the southeast in Wilmot Township, is a similar meander in the river.

REFERENCE: Pennsylvania Historical and Museum Commission (1973), *French Azilum, site of colony for refugees from the French Revolution, built on the Susquehanna, Pennsylvania Trail of History*, Harrisburg.



APPALACHIAN PLATEAUS PROVINCE
GLACIATED LOW PLATEAUS SECTION



153. FULMER FALLS

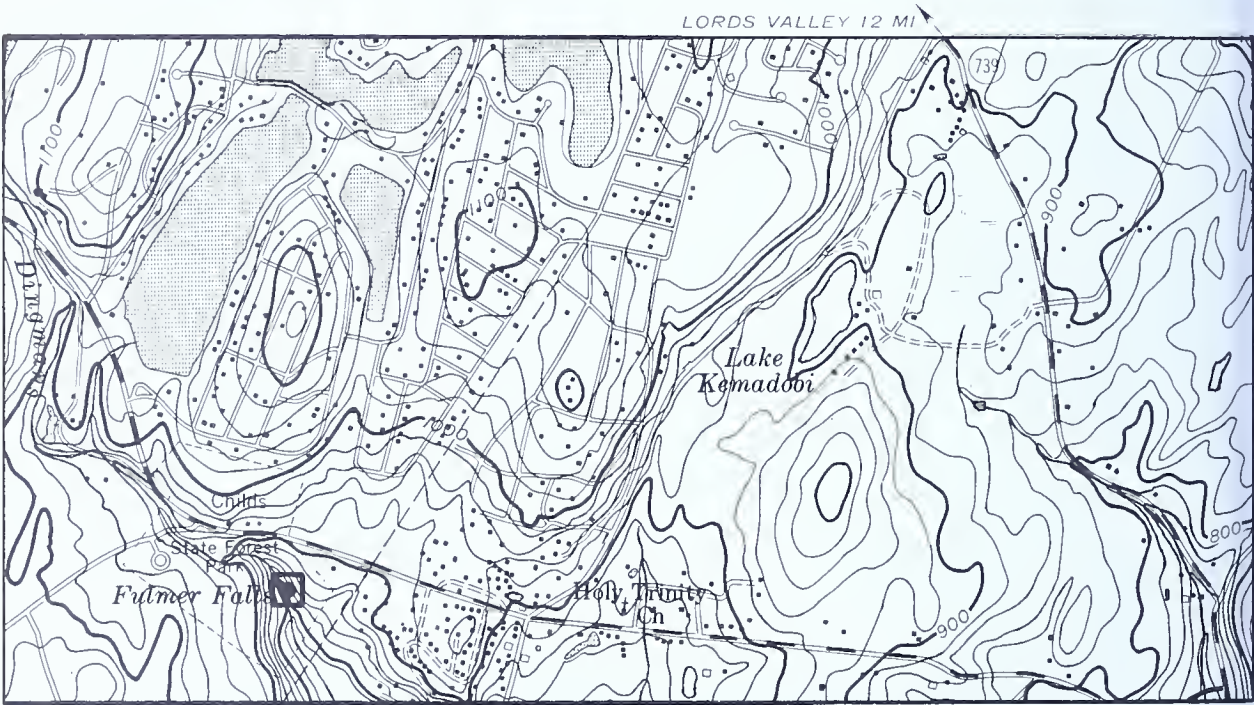
COUNTY: Pike

TOWNSHIP: Delaware

QUADRANGLE: Lake Maskenozha

LOCATION: Three miles west of the village of Dingmans Ferry; within Childs State Park on Dingmans Creek.

REMARKS: A highly scenic area and one of the Commonwealth's most spectacular waterfalls.



NOTES:

APPALACHIAN PLATEAUS PROVINCE
GLACIATED LOW PLATEAUS SECTION



154. JESSUP OVERLOOK

COUNTY: Susquehanna

TOWNSHIP: Jessup

QUADRANGLE: Montrose West

LOCATION: About 1.5 miles south of Snows Mill.

REMARKS: A spectacular scenic view of the Glaciated Low Plateaus section (locally known as the "Endless Mountains"). Grassy hillsides, rounded hilltops, broad U-shaped valleys, flagstone-boulder fence rows, and flagstone quarries are common.

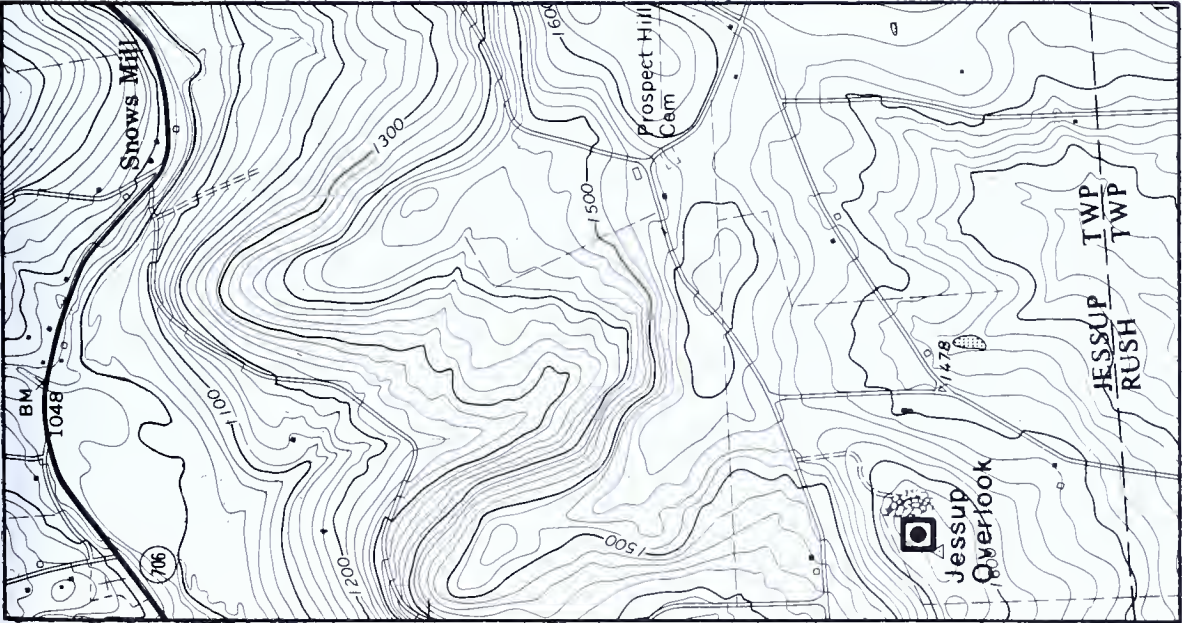
REFERENCES: Glaeser, J. D. (1969), *Geology of flagstones in the Endless Mountains region, northern Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Information Circular 66, 14 p.
Susquehanna Planning Commission (1970), *Inventory of natural, scenic, and historic areas, Montrose, Pennsylvania*, 2 p.



APPALACHIAN PLATEAUS PROVINCE
GLACIATED LOW PLATEAUS SECTION



FLAGSTONE QUARRY AT SITE



155. KELLERSVILLE ESKER

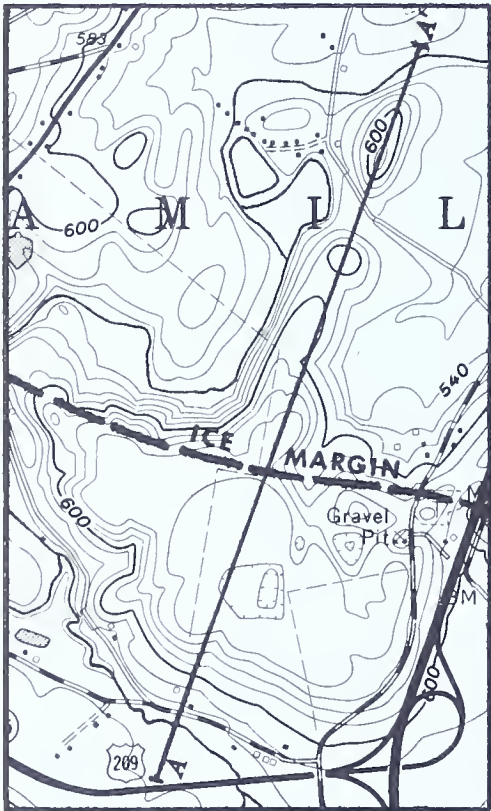
COUNTY: Monroe TOWNSHIP: Hamilton

QUADRANGLE: Saylorsburg

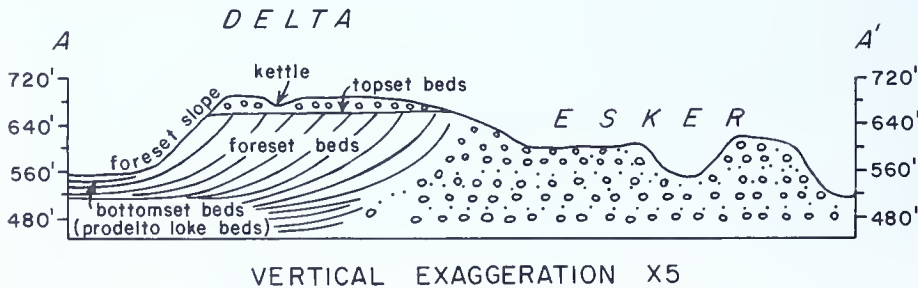
LOCATION: Approximately 3.5 miles north of Saylorsburg.

REMARKS: An outstanding example of an esker and a delta and lake plain.

REFERENCE: Epstein, J. B., and Epstein, A. G. (1967), *Geology in the region of the Delaware to Lehigh Water Gaps*, Guidebook, 32nd Annual Field Conference of Pennsylvania Geologists, Pennsylvania Geological Survey, 4th ser., 89 p.



TOPOGRAPHIC MAP AND GEOLOGIC SECTION OF ESKER AND DELTA: Shows inferred position of the ice margin at the time of deposition of the delta. Sand and gravel is being quarried from the delta; very coarse gravel is exposed in the esker. From reference cited above, p. 39.



APPALACHIAN PLATEAUS PROVINCE
GLACIATED LOW PLATEAUS SECTION



156. LAKE LACAWAC

COUNTY: Wayne

TOWNSHIP: Paupack

QUADRANGLE: Lakeville

LOCATION: Approximately 1 mile west of Lake Wallenpaupack.

REMARKS: This is the southernmost glacial lake in the United States. Adjoining the lake are floating bog mats, and a research station that has classroom facilities. The site is a registered National Natural Landmark.



APPALACHIAN PLATEAUS PROVINCE
GLACIATED LOW PLATEAUS SECTION



157. MT. PISGAH

COUNTY: Bradford

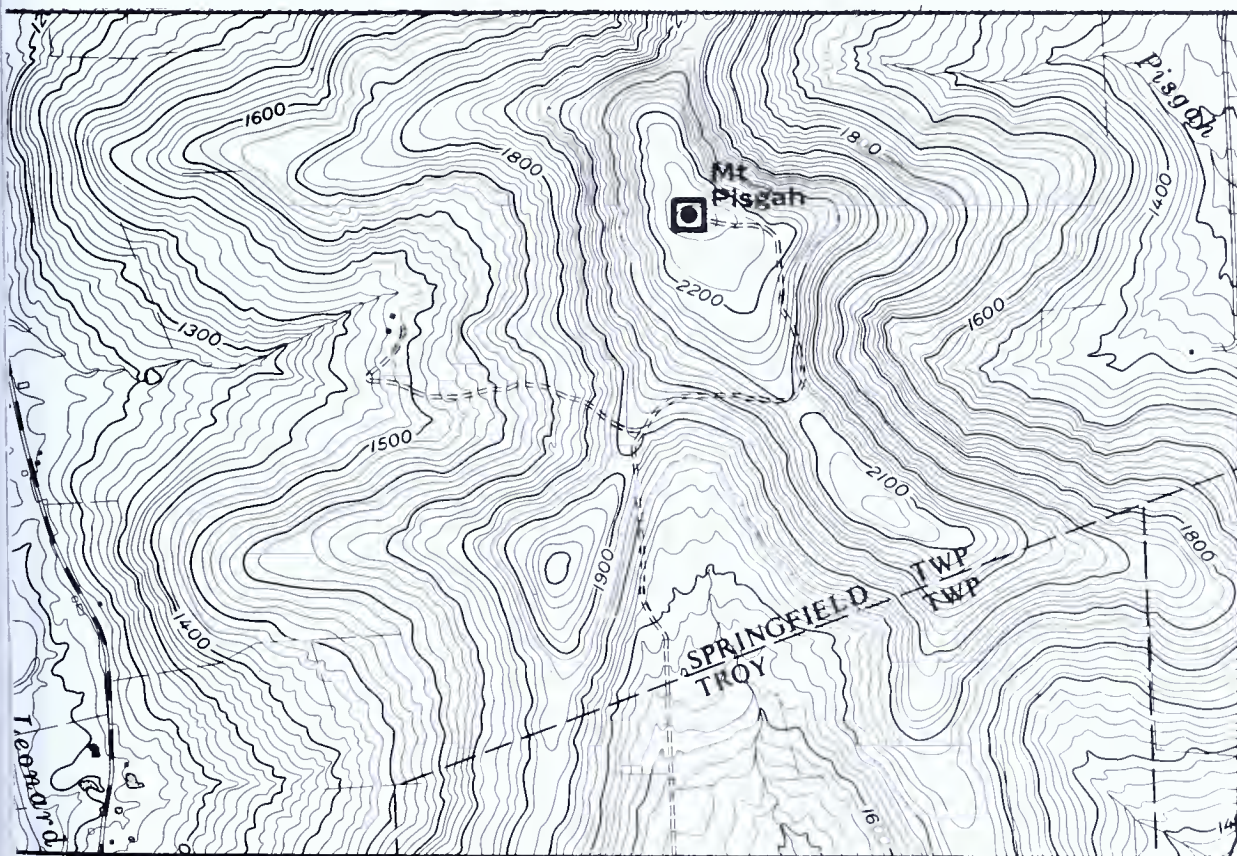
TOWNSHIP: Springfield

QUADRANGLE: East Troy

LOCATION: Within Mt. Pisgah State Park; 3 miles northeast of the village of East Troy and U. S. Route 6.

REMARKS: One of the highest mountain peaks in this physiographic province, the site affords an excellent view of the Glaciated Low Plateaus section. Outcrops of gray-green sandstones and siltstones of the Lock Haven Formation (Devonian age) are present at the site.

REFERENCE: Woodrow, D. L. (1968), *Stratigraphy, structure and sedimentary patterns in the Upper Devonian of Bradford County, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., General Geology Report 54, 78 p.



EAST TROY

158. OVERLOOK CLIFF

COUNTY: Wayne

TOWNSHIP: Scott

QUADRANGLE: Hancock

LOCATION: Between the village of Balls Eddy and the New York State line, along the west side of the Delaware River.

REMARKS: A series of red siltstones and gray sandstones (Catskill Formation, Devonian age) are exposed in massive cliffs formed by the Delaware River as it eroded through these rocks. From **Hawks Nest** (159) and other points along the top of the cliff there is a breathtaking view of the **Delaware River Gorge** (160). The gorge is wild and scenic from Matamoras north to the New York boundary. Waterfalls and springs are common along the gorge.

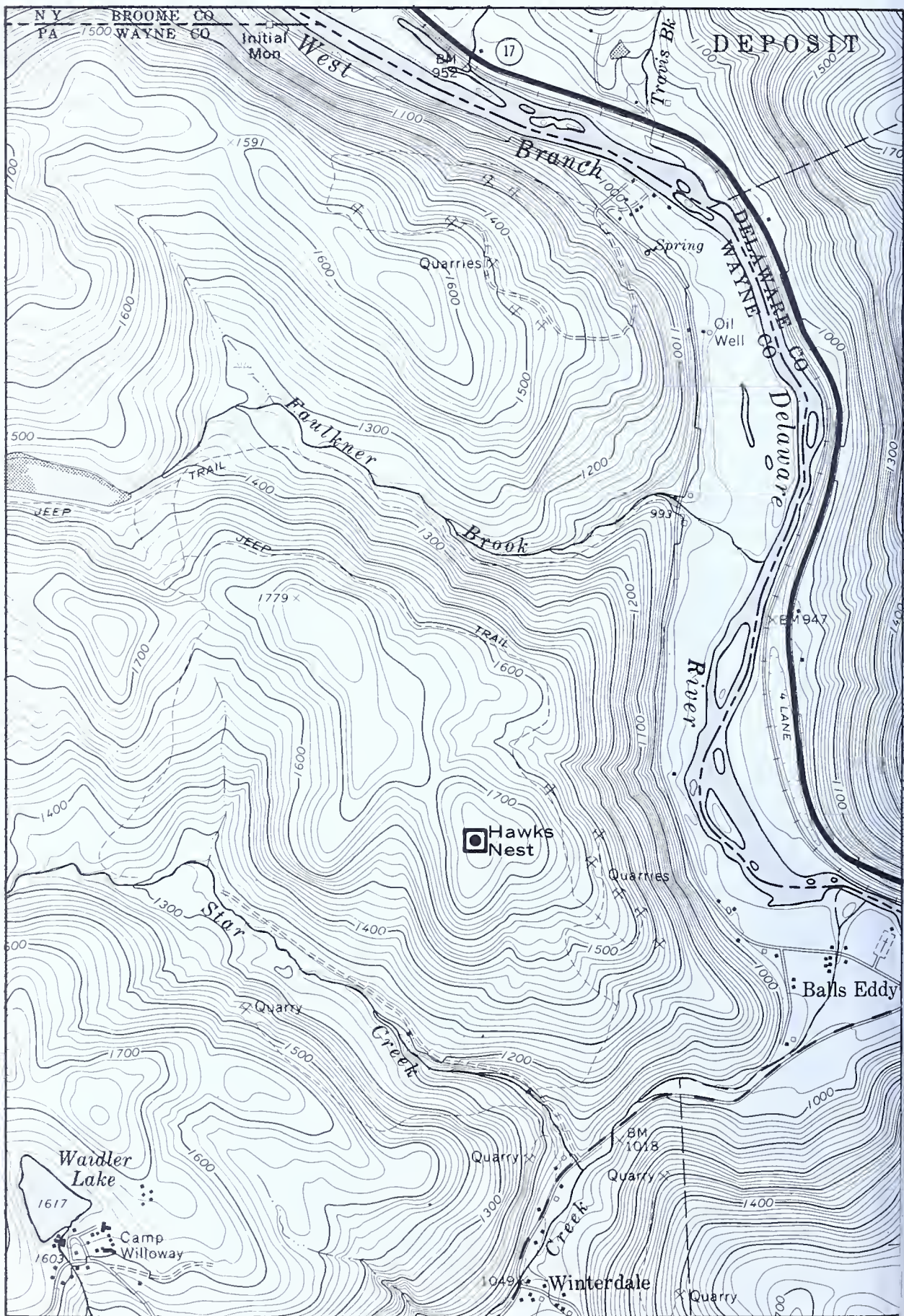
Six hundred feet west of the northeast corner of Pennsylvania is the first monument of granite marking the Pennsylvania-New York State boundary. The monument was erected in 1884.



APPALACHIAN PLATEAUS PROVINCE
GLACIATED LOW PLATEAUS SECTION



OUTSTANDING SCENIC GEOLOGICAL FEATURES OF PENNSYLVANIA
158. OVERLOOK CLIFF (continued)



APPALACHIAN PLATEAUS PROVINCE

GLACIATED LOW PLATEAUS SECTION



161. SALT SPRINGS

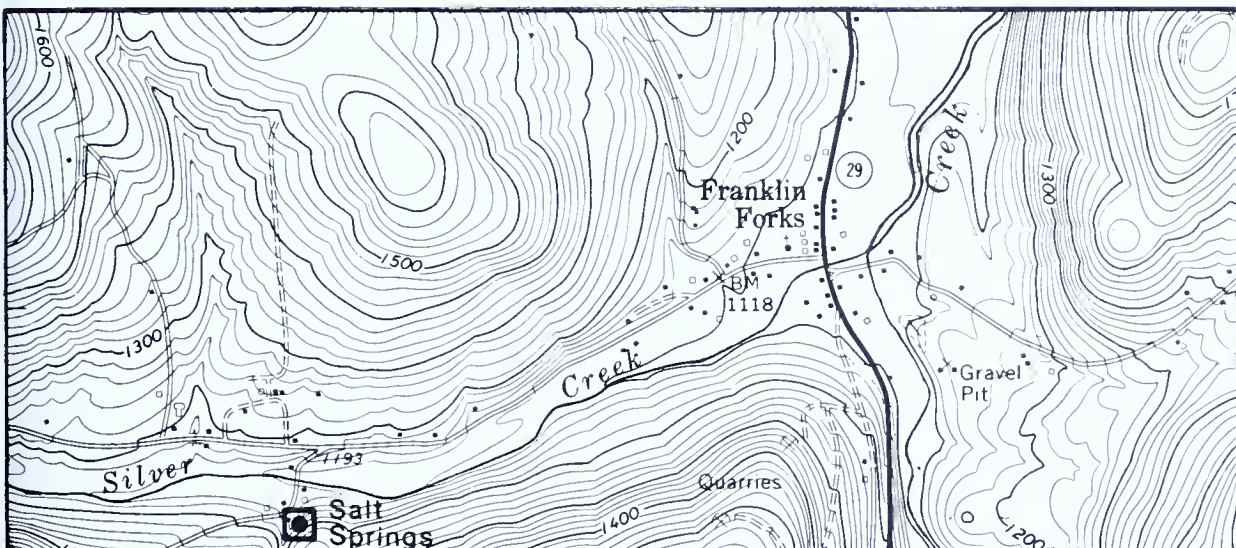
COUNTY: Susquehanna

TOWNSHIP: Franklin

QUADRANGLE: Franklin Forks

LOCATION: About 1 mile west of Franklin Forks on Salt Springs Road; within Salt Springs State Park.

REMARKS: A short narrow gorge of Fall Brook has a series of small waterfalls and an unusual salt spring near the gorge mouth.



162. SHOHOLA FALLS

COUNTY: Pike

TOWNSHIP: Shohola

QUADRANGLE: Shohola

LOCATION: State Game Lands No. 180 surrounds and includes the gorge; adjacent to the village of Shohola Falls.

REMARKS: Shohola Creek descends 200 feet in half a mile through falls and rapids. The gorge (Shohola Glen), approximately 80 feet deep, is developed on a vertical-walled rock fracture; shales and siltstones of the Catskill Formation (Devonian age) are exposed in the gorge cliffs. The falls just below the dam are the most spectacular. The Pennsylvania Game Commission has named the region the "Shohola Recreation Area."

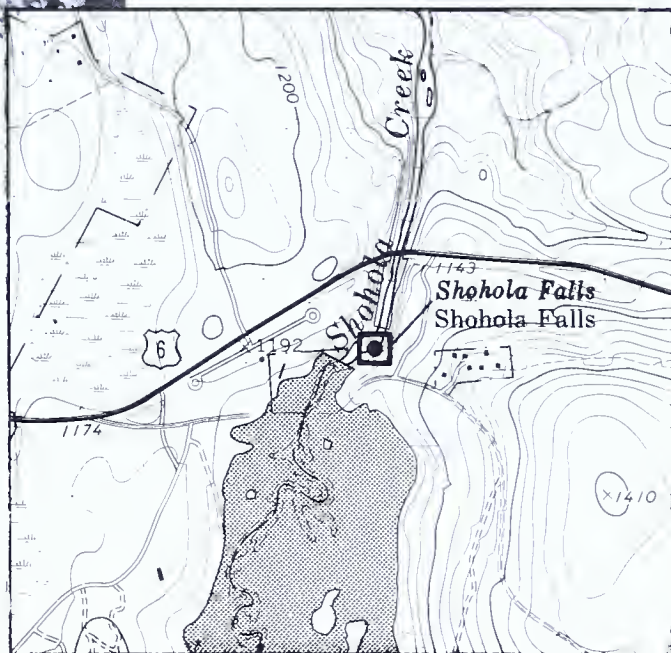


APPALACHIAN PLATEAUS PROVINCE
GLACIATED LOW PLATEAUS SECTION



SHOHOLA GLEN

REFERENCE: Fletcher, F. W.,
and Woodrow, D. L. (1970),
*Geology and economic re-
sources of the Pennsylvania
portion of the Milford and
Port Jervis 15-minute quad-
rangles*, Pennsylvania Geo-
logical Survey, 4th ser., Atlas
223, 64 p.



163. TANNERSVILLE CRANBERRY BOG

COUNTY: Monroe

TOWNSHIP: Pocono

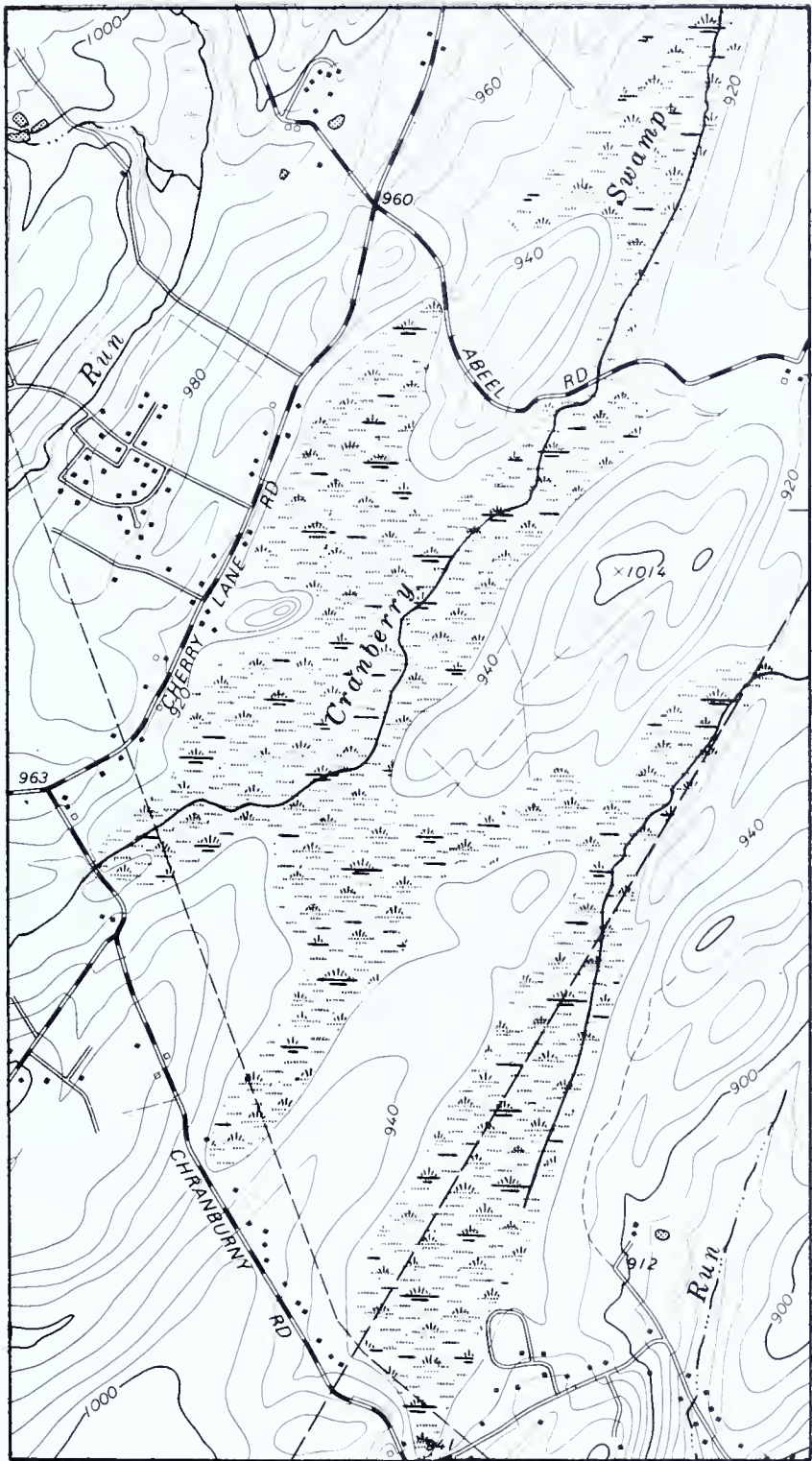
QUADRANGLE: Mount Pocono

LOCATION: The bog parallels Cherry Lane Road east of Pa. Route 611 near Tannersville.

REMARKS: A large peat bog; abundant quantities of sphagnum moss (peat) are present. This is the best developed, most southern, low-altitude boreal bog along the eastern seaboard.



APPALACHIAN PLATEAUS PROVINCE
GLACIATED LOW PLATEAUS SECTION



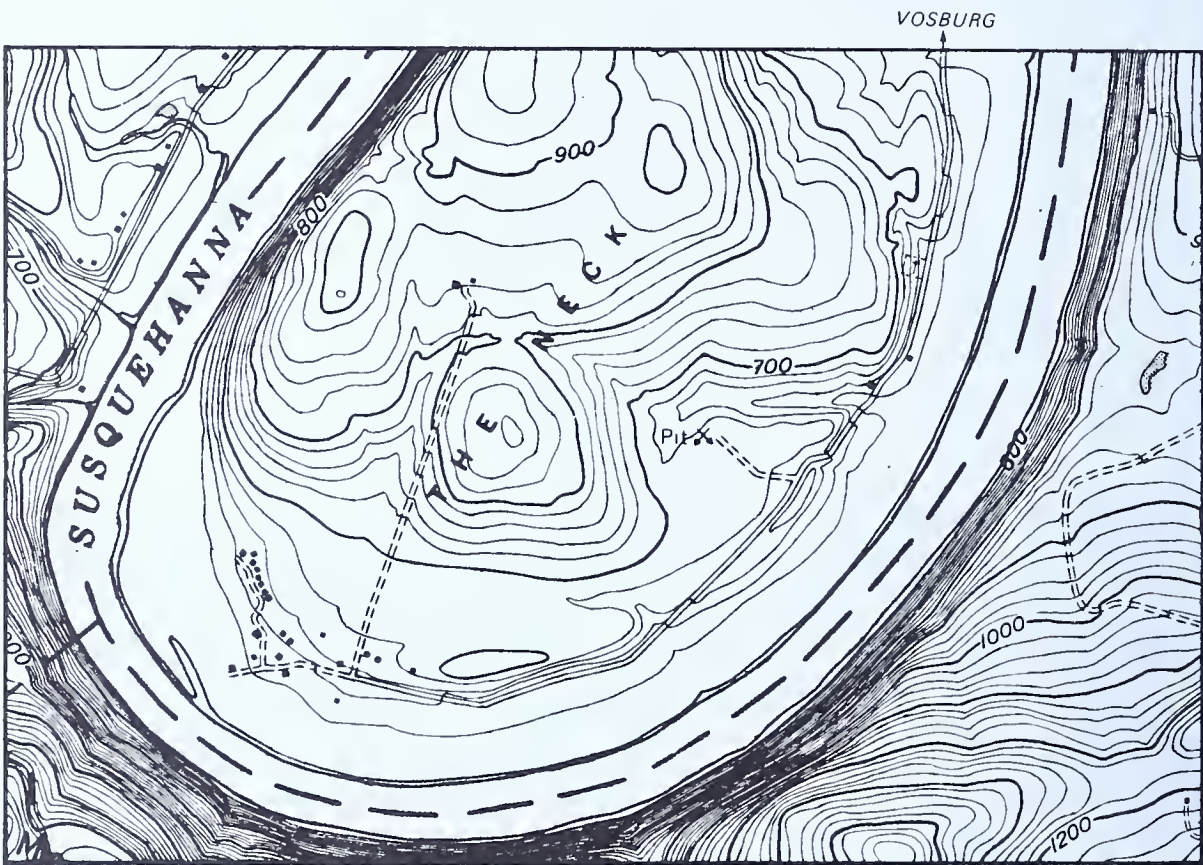
164. THE NECK

COUNTY: Wyoming

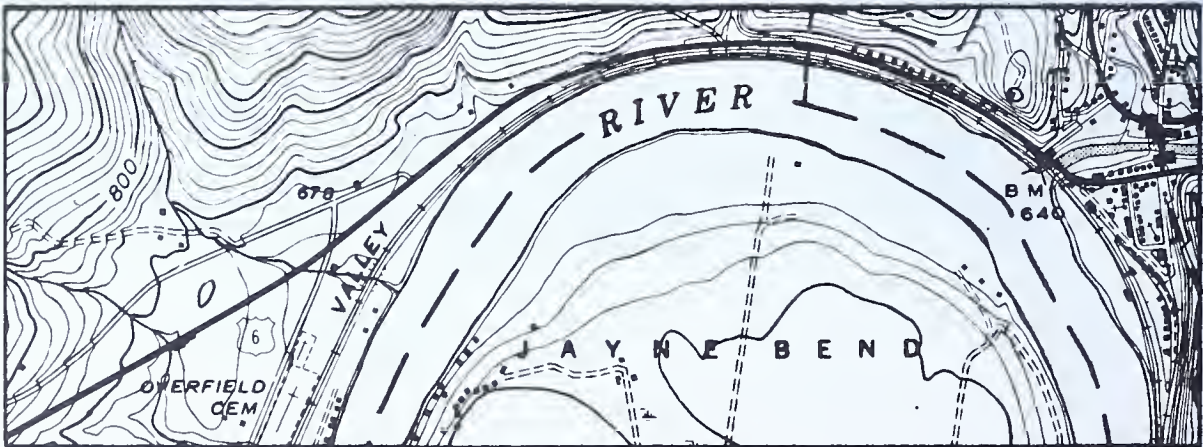
TOWNSHIP: Washington

QUADRANGLE: Meshoppen

LOCATION: Two and one-half miles southeast of the village of Mehoopany.



REMARKS: A large meander in the Susquehanna River isolates a parcel of land over 2 miles long and more than a mile wide, named "The Neck." Jayne Bend (165) is a similar feature nearby.

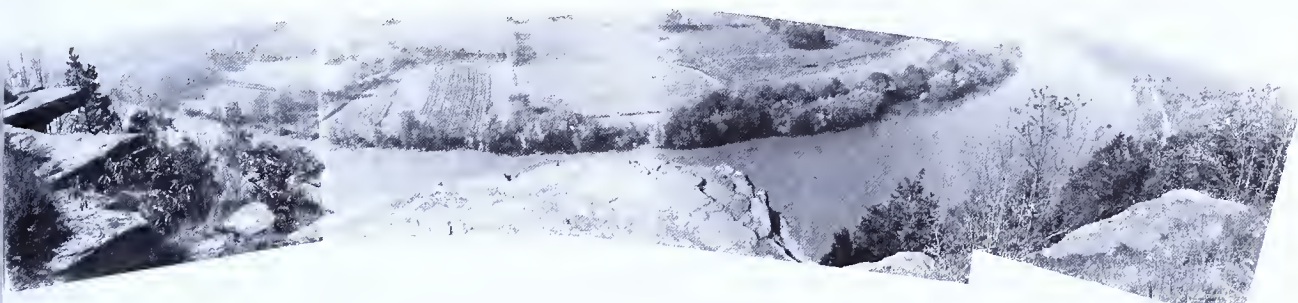
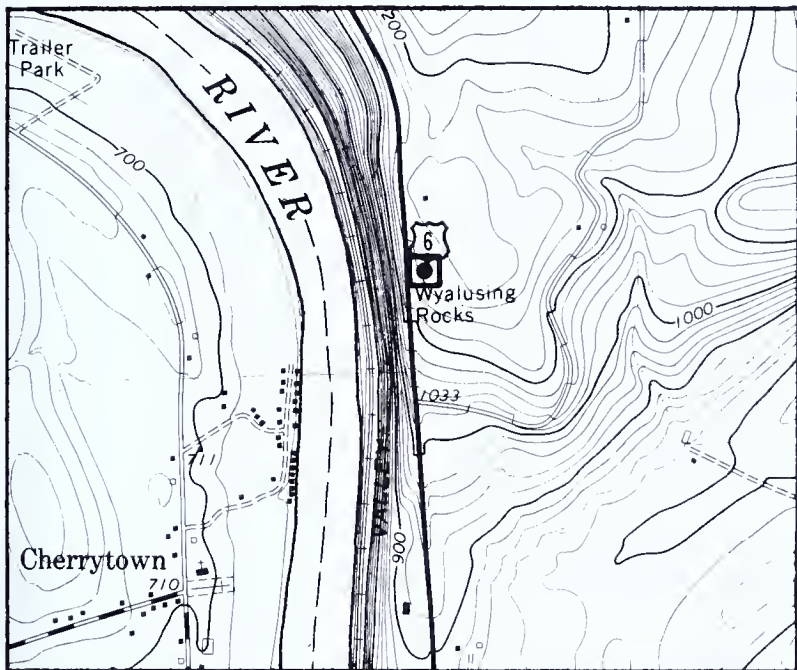


APPALACHIAN PLATEAUS PROVINCE
GLACIATED LOW PLATEAUS SECTION



166. WYALUSING ROCKS (PRAYER ROCKS)

COUNTY: Bradford
TOWNSHIP: Wyalusing
QUADRANGLE:
Wyalusing



LOCATION: U. S. Route 6, 1.3 miles north of the Borough of Wyalusing.

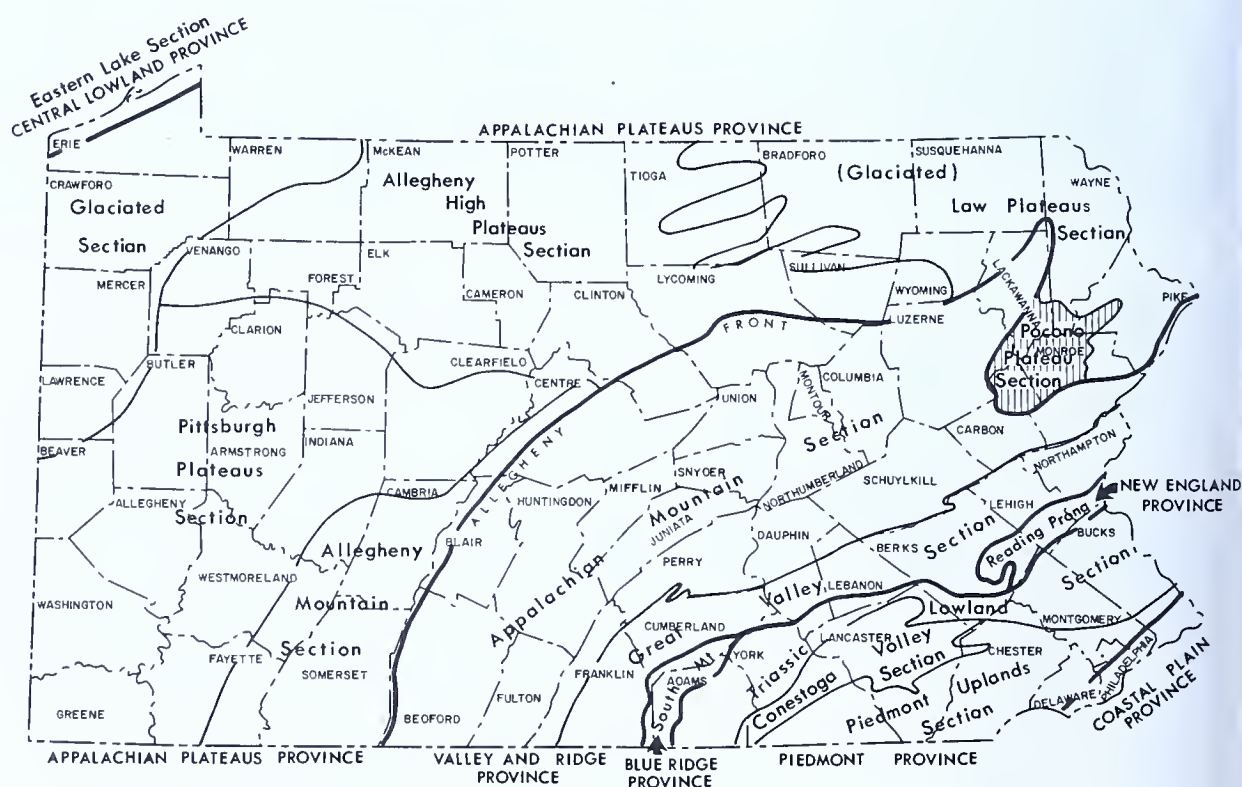
REMARKS: Famous Iroquois "Prayer Rocks"; also a look-out on the Iroquois Warriors Path. Over this trail, which entered Pennsylvania along the upper Susquehanna, traveled the Six Nations' (New York) war parties against southern Indians, and their peace missions to Philadelphia. Alternating red and green, flat-lying sandstones and siltstones of the Catskill Formation (Devonian age) form a platform-like projection atop a high cliff overlooking a beautiful valley of the Susquehanna River. The Pennsylvania Department of Transportation has provided a scenic overlook and parking area at the site.

APPALACHIAN PLATEAUS PROVINCE — POCONO PLATEAU SECTION

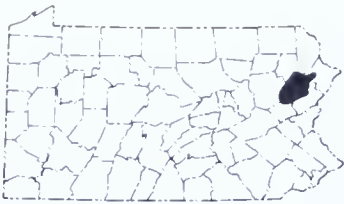
TOPOGRAPHY AND ROCK STRUCTURE

The Pocono Plateau is located in the extreme southeastern corner of the Appalachian Plateaus province. Its scenic eastern rim towers about 1000 feet above the surrounding countryside.

The plateau is known as the "Pocono Mountains." The term mountain is, of course, incorrect but has become so ingrained in common usage that the name will no doubt continue to be used. The rocks have a relatively low dip toward the east, resulting in a gently sloping rock structure in the plateau. The topographic relief within the plateau is low and seldom exceeds 100 feet. Slopes are generally low, and the entire section has been glaciated. The principal expression of ground moraine on most of the plateau is subtle and almost featureless; the main topographic interruptions are stream valleys and occasional bedrock ridges that protrude through the moraine. Between the Lehigh River and Camelback Mountain, the Woodfordian "terminal moraine" is the most striking glacial feature in northeastern Pennsylvania. In the area of the plateau, the end moraine is a



APPALACHIAN PLATEAUS PROVINCE
POCONO PLATEAU SECTION



well-defined belt averaging a mile in width and characterized by an almost trackless maze of hummocky topography. Local relief varies from 10 to 100 feet. Undrained depressions, frequently containing swamps and peat bogs, are common.

ROCK COLUMN

The rocks of the Pocono Plateau are of Mississippian and Devonian age and consist of shales, sandstones, and conglomerates.

A description of the rock units follows:

SYSTEM	ROCK UNIT	DESCRIPTION
Mississippian	Mauch Chunk Formation	Red shale and brown and greenish-gray sandstone.
	Pocono Formation	Gray hard conglomerate, sandstone, and some shale.
Mississippian and Devonian	Spechty Kopf Formation	Light- to olive-gray, fine- to medium-grained, crossbedded sandstone, siltstone, and pebbly mudstone in fining-upward cycles. Local conglomerate.
Devonian	Catskill Formation	Reddish-brown shale and sandstone; some gray and greenish sandstone.



167. **BIG POCONO OVERLOOK (POCONO KNOB)**

COUNTY: Monroe

TOWNSHIP: Jackson

QUADRANGLE: Mount Pocono

LOCATION: On top of Camelback Mountain; 2.3 miles west of the village of Tannersville; within Big Pocono State Park.

REMARKS: Camelback Mountain (2133-foot elevation) is a striking topographic projection marking the edge of the Pocono Plateau in Monroe County. This is the highest point in the area, upheld by rocks of the Catskill Formation (Devonian age)



APPALACHIAN PLATEAUS PROVINCE

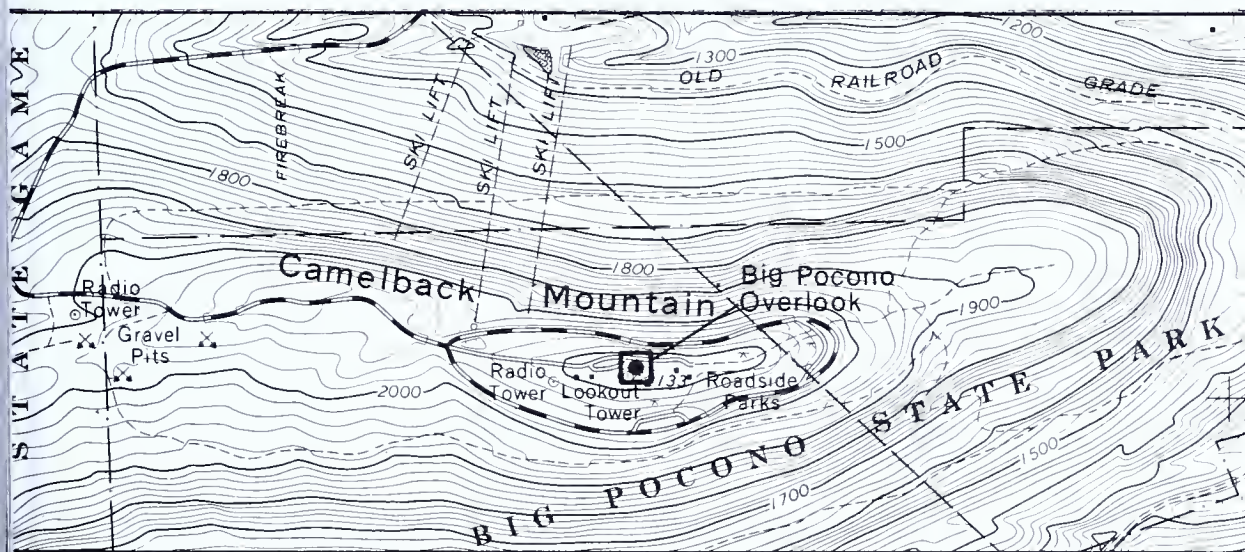
POCONO PLATEAU SECTION



that show evidence of having been covered by ice during the Woodfordian glaciation. On a clear day, the Catskill Mountains of New York State can be seen; the site is also known as **Pocono Knob**.

REFERENCES:

- Berg, T. M., Bucek, M. F., and Sevon, W. D. (1976), *Geology and mineral resources of the Pocono Pines and Mount Pocono quadrangles, Monroe County, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Atlas 204cd.
- White, I. C. (1882), *The geology of Pike and Monroe Counties*, Pennsylvania Geological Survey, 2nd ser., Report of Progress G6, p. 7.



NOTES:

168. HICKORY RUN BOULDER FIELD

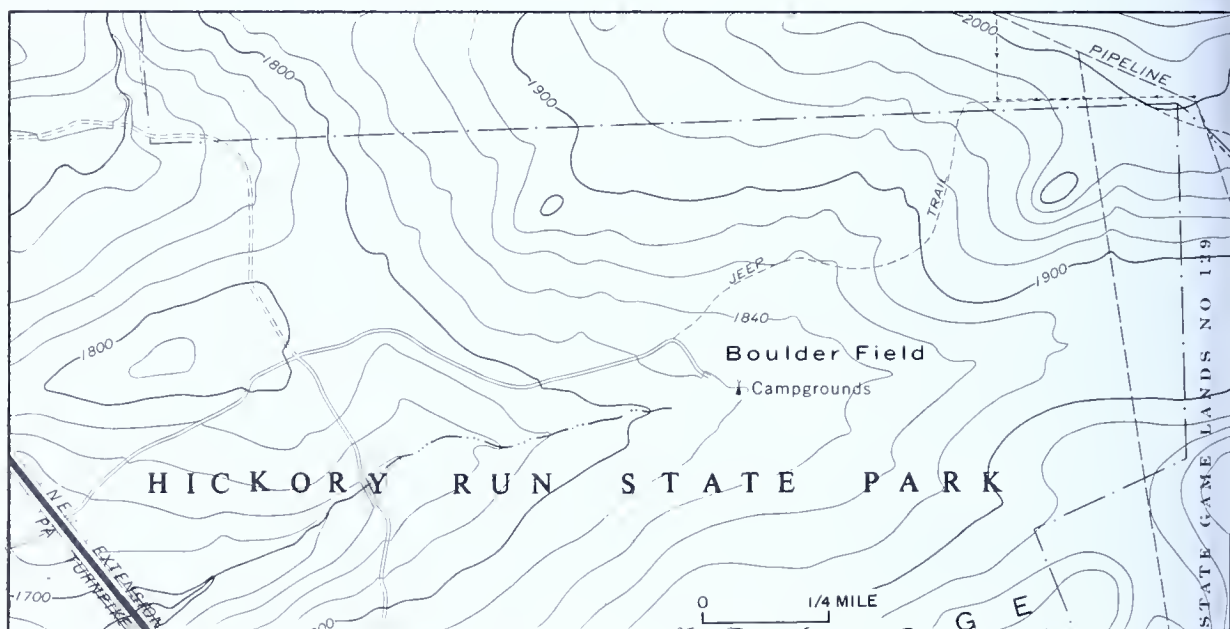
COUNTY: Carbon

TOWNSHIP: Kidder

QUADRANGLE: Hickory Run

LOCATION: Approximately 10 miles southeast of White Haven along Pa. Route 534.

REMARKS: One of the most striking geologic features in the state; the boulder field has remained relatively unchanged for more than 20,000 years. It measures about 400 feet by 1800 feet and is at least 12 feet deep. This feature is the largest of its kind in the Appalachian Mountains of the eastern United States, and is a registered National Natural Landmark.



- REFERENCES:
- Geyer, A. R. (1969), *Hickory Run State Park: Boulder field*, Pennsylvania Geological Survey, 4th ser., Park Guide 2.
 - Sevon, W. D. (1969), *Sedimentology of some Mississippian and Pleistocene deposits of northeastern Pennsylvania*, in Subitzky, Seymour, ed., *Geology of selected areas in New*

APPALACHIAN PLATEAUS PROVINCE

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Jersey and eastern Pennsylvania and guide-book of excursions, Geological Society of America Annual Meeting, New Brunswick, N. J., Rutgers University Press, p. 214-234.

Smith, H. T. U. (1953), *The Hickory Run Boulder Field, Carbon County, Pennsylvania*, American Journal of Science, v. 251, p. 625-642.



NOTES:

169. HIGH KNOB

COUNTY: Pike

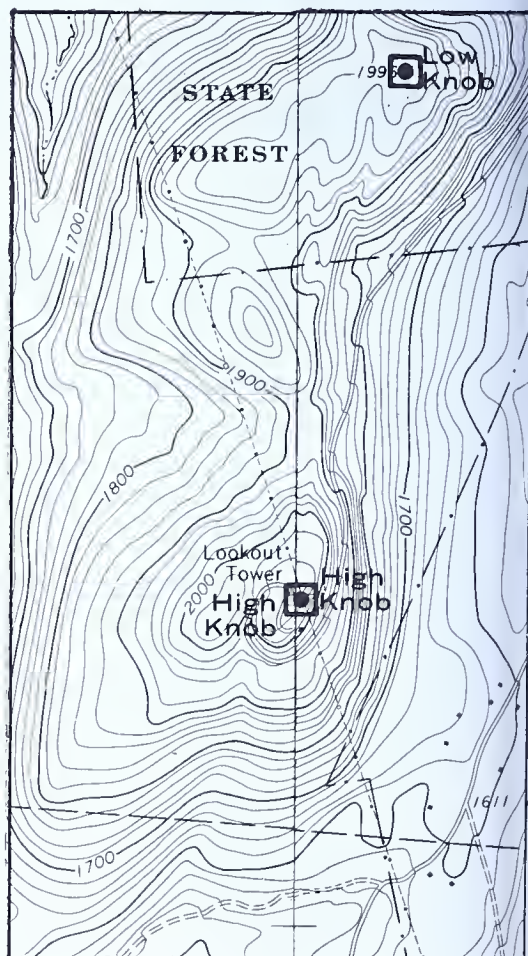
TOWNSHIP: Blooming Grove

QUADRANGLES: Pecks Pond and Promised Land

LOCATION: About 2 miles northwest of Pecks Pond; within the Delaware State Forest.

REMARKS: High Knob reaches an elevation of about 2050 feet and marks the most northeastern point at which the Pocono Plateau escarpment is well developed; to the north of this point the plateau loses its distinctiveness. High Knob is upheld by red and green-gray, flaggy-bedded sandstones and conglomerates of the Catskill Formation (Devonian age). From the top of the knob, on a clear day, one can see from the Catskill Mountains of New York State to the Lehigh Water Gap and to the Moosic Mountains; truly, a grand vista. **Low Knob** (170), at elevation 1996, is nearby.

REFERENCE: White, I. C. (1882), *The geology of Pike and Monroe Counties*, Pennsylvania Geological Survey, 2nd ser., Report of Progress G6, p. 179.



APPALACHIAN PLATEAUS PROVINCE
POCONO PLATEAU SECTION



NOTES: -

171. INDIAN LADDER FALLS

COUNTY: Pike

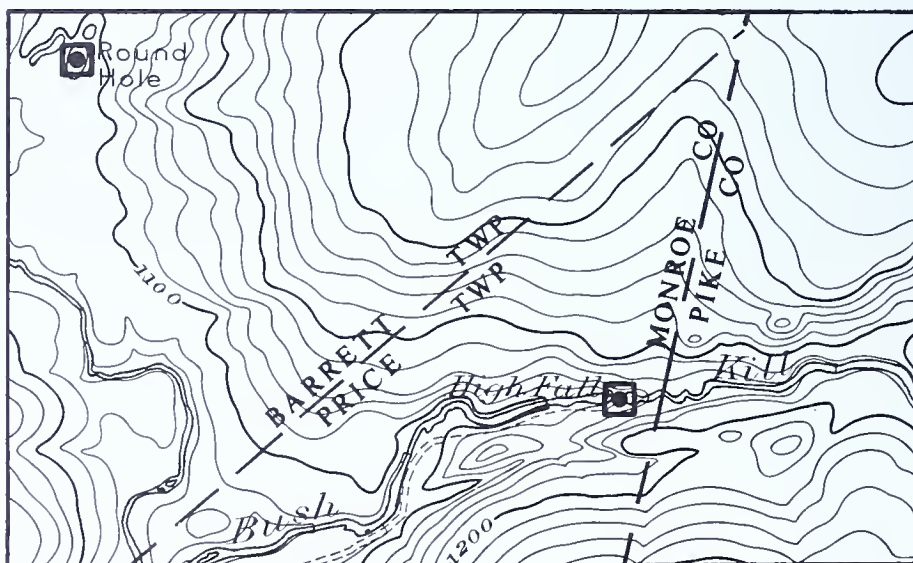
TOWNSHIP: Greene

QUADRANGLE: Skytop

LOCATION: At the Pocono Plateau escarpment immediately east of Pa. Route 390; 4.2 miles north of the village of Canadensis. Skytop Lodges Inc. owns and maintains this site. Permission to enter must be obtained.

REMARKS: A very scenic falls cascades over gray and red sandstones, siltstones, and claystones of the Long Run Member of the Catskill Formation (Devonian age) at the escarpment of the Pocono Plateau; other falls nearby, **High Falls** (172), **Spruce Cabin Falls** (173), and **Leavitt Falls** (174), occur in the adjacent Glaciated Low Plateaus section. **Round Hole** (175), also in the Glaciated Low Plateaus section, is an oxbow lake (a meander of Brights Creek that has been completely cut off, leaving an isolated lake). All of the latter features in the Low Plateaus are in Monroe County.

REFERENCE: Sevon, W. D., and Berg, T. M. (1978), *Geology and mineral resources of the Skytop quadrangle, Monroe and Pike Counties, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Atlas 214a, 33 p.

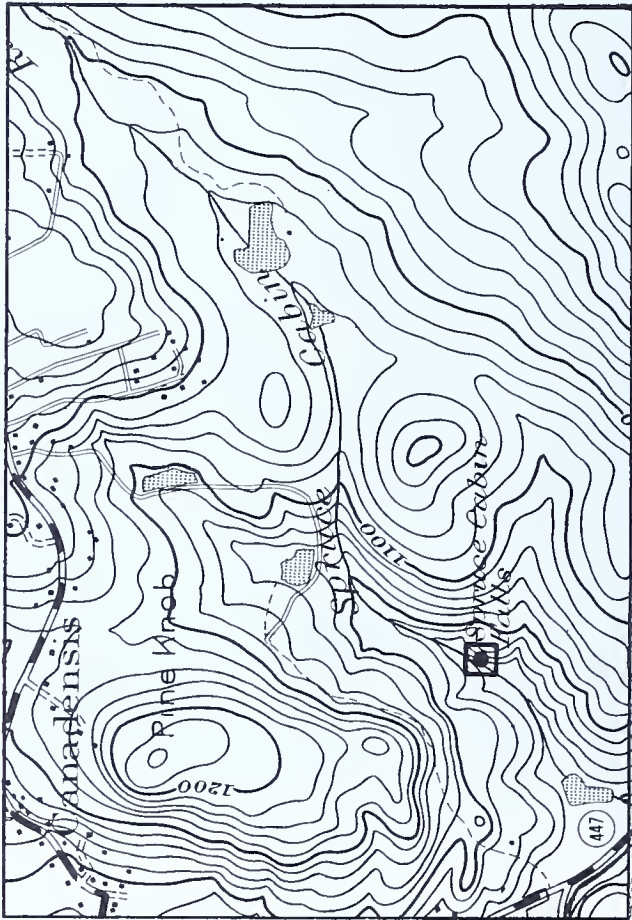
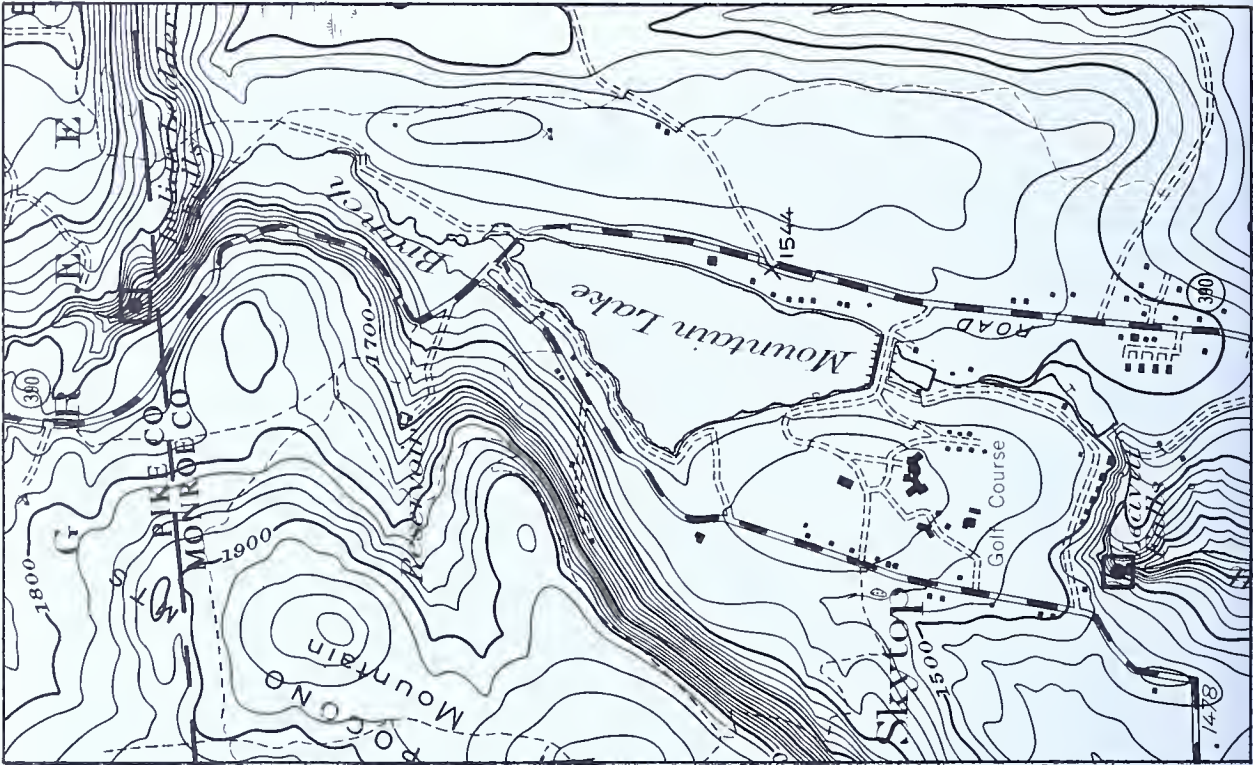


APPALACHIAN PLATEAUS PROVINCE

POCONO PLATEAU SECTION



171. INDIAN LADDER FALLS (continued)

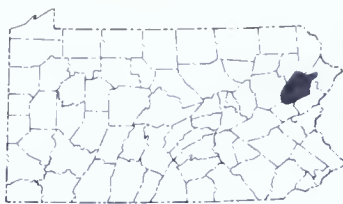


SPRUCE CABIN FALLS

NEWFOUNDLAND 10 MI.
COVEVILLE 1.6 MI.

APPALACHIAN PLATEAUS PROVINCE

POCONO PLATEAU SECTION



176. MOUNT POCONO OVERLOOK

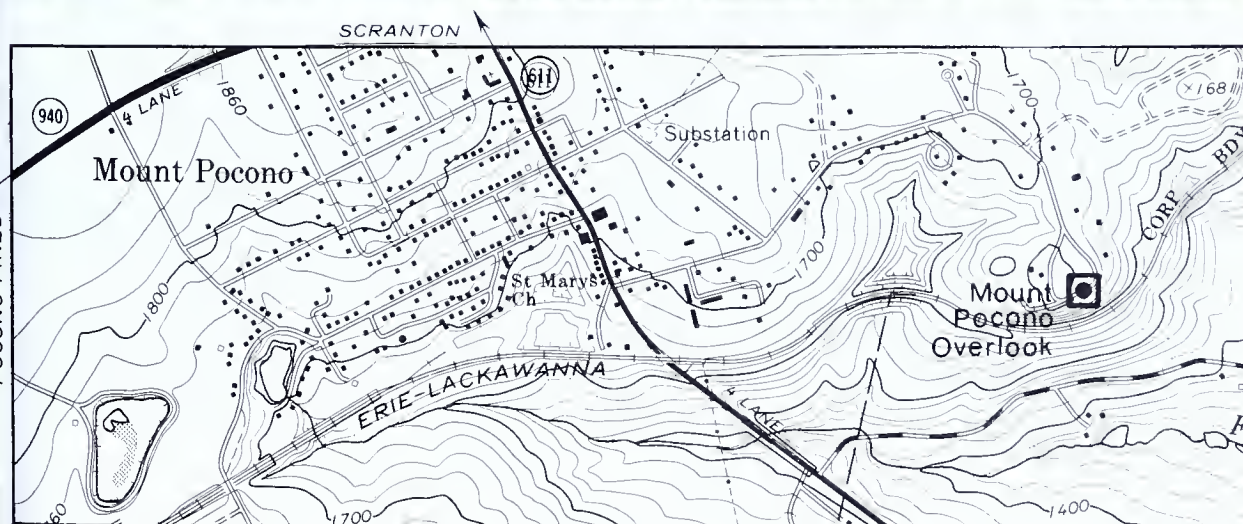
COUNTY: Monroe

BOROUGH: Mount Pocono

QUADRANGLE: Mount Pocono

LOCATION: Along Knob Road in the Borough of Mount Pocono.

REMARKS: A magnificent view of the rim of the Pocono Plateau and east into the Glaciated Low Plateaus section; a view of the Delaware Water Gap in the distance. Outcrops of red siltstone of the Catskill Formation (Devonian age) are present at the overlook.



177. PROSPECT ROCK

COUNTY: Wayne

TOWNSHIP: Lehigh

QUADRANGLE: Tobyhanna

LOCATION: Within Gouldsboro State Park; 1.1 miles west of the village of Gouldsboro.

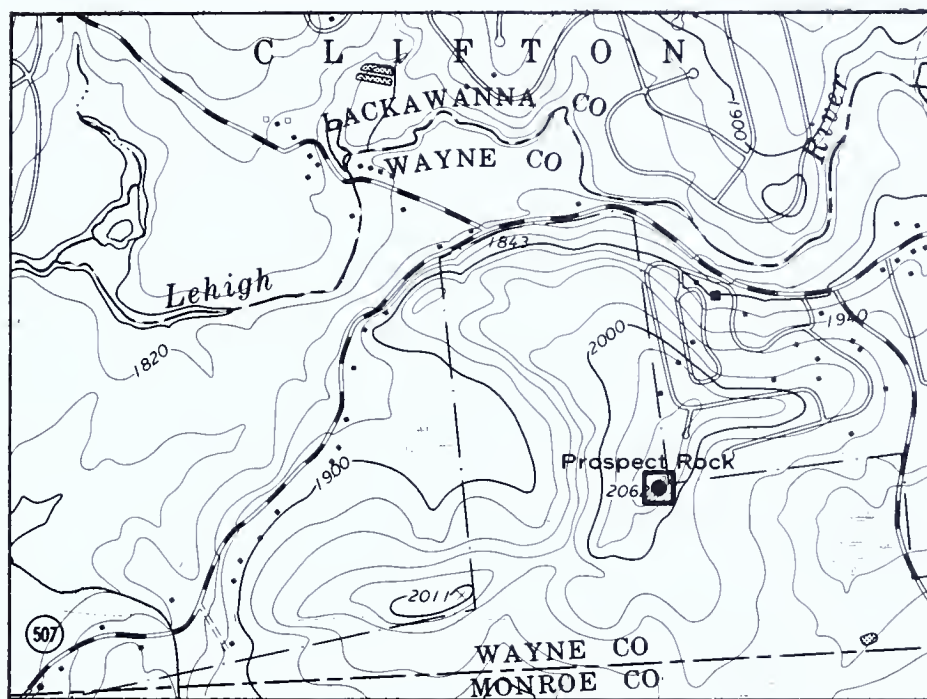
REMARKS: A small, but picturesque, cliff of near-horizontal crossbedded sandstone (Catskill Formation, Duncannon Member, Devonian age); the 20-foot vertical face on the cliff is developed on a prominent joint (fracture) in the rocks.

REFERENCE: Sevon, W. D. (1975), *Geology and mineral resources of the Tobyhanna and Buck Hill Falls quadrangles, Monroe County, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Atlas 204ab.



APPALACHIAN PLATEAUS PROVINCE

POCONO PLATEAU SECTION



NOTES:

178. SPLIT ROCK

COUNTY: Carbon

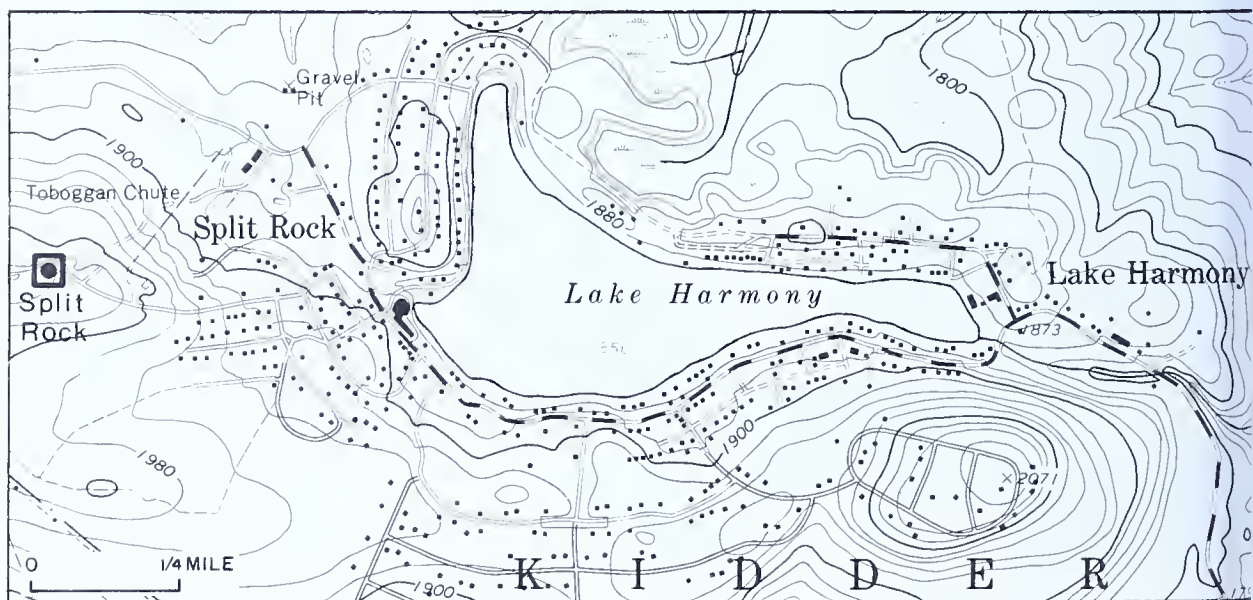
TOWNSHIP: Kidder

QUADRANGLE: Blakeslee

LOCATION: In the village of Split Rock.

REMARKS: A unique occurrence of the Duncannon Member of the Catskill Formation (Devonian age). A large outcrop of steeply dipping, red quartzitic sandstone about 25 feet high is separated by a 5- to 6-foot split (joint separation). The occurrence is unique in northeastern Pennsylvania and the outcrop itself is anomalous because of the steep bedding dip.

REFERENCE: Sevon, W. D. (1975), *Geology and mineral resources of the Hickory Run and Blakeslee quadrangles, Carbon and Monroe Counties, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Atlas 194cd.



APPALACHIAN PLATEAUS PROVINCE
POCONO PLATEAU SECTION



NOTES:

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



tween 200 and 1500 feet above sea level. The maximum relief occurs in Bedford County about 1 mile east of Hyndman, where the elevation of Wills Mountain is 2800 feet and the elevation in the adjacent valley to the west is 1000 feet, resulting in a relief of 1800 feet. Generally the relief between a ridge and a neighboring valley varies from 800 to 1000 feet.

ROCK COLUMN

A wide range of rock types exists. A general description of the rock units follows:

SYSTEM	ROCK UNIT	DESCRIPTION
Quaternary	Alluvium	Sorted clay to very coarse gravel.
Pennsylvanian	Post-Pottsville Formations (includes Llewellyn Formation)	Sandstone, conglomerate, shale, fireclay, slate, and numerous coal beds.
	Pottsville Formation	Hard coarse quartz conglomerate; brown and gray sandstone; a few thin seams of coal.
Mississippian	Mauch Chunk Formation	Red shale and brown flaggy sandstone.
	Pocono Formation and Burgoon Sandstone	Hard massive yellowish-gray sandstone; conglomerate, some shale, and some coal.
Mississippian and Devonian	Rockwell Formation, Burgoon-Catskill transition zone, and Spechty Kopf Formation	Gray, fine- to coarse-grained sandstone, siltstone, and shale (Rockwell); greenish- and olive-gray sandstone, siltstone, and shale (Burgoon-Catskill transition zone); and light- to olive-gray, fine- to medium-grained, crossbedded sandstone, siltstone, and pebbly mudstone in fining-upward cycles (Spechty Kopf).
Devonian	Catskill Formation	Red shale and thin gray sandstone.
	Foreknobs, Scherr, and Lock Haven Formations	Medium- to olive-gray sandstone, siltstone, and shale (Foreknobs); olive- and greenish-gray, fossiliferous siltstone, shale, and sandstone (Scherr); and olive-gray to olive-brown, fossiliferous shale, siltstone, and sandstone and local thin conglomerate (Lock Haven).

OUTSTANDING SCENIC GEOLOGICAL FEATURES OF PENNSYLVANIA

SYSTEM	ROCK UNIT	DESCRIPTION
Devonian	Trimmers Rock and Brallier Formations	Olive-gray siltstone and shale; locally, very fine grained sandstone.
	Harrell Formation	Light- to olive-gray shale; very dark gray shale at base.
	Hamilton Group	
	Mahantango Formation	Olive- and medium-gray sandstone, siltstone, and shale; medium-gray limestone and calcareous shale at top.
	Marcellus Formation	Black fissile carbonaceous shale; sandstone or shaly limestone locally in lower part.
	Onondaga Formation and Buttermilk Falls Limestone	Onondaga: Medium-gray calcareous fossiliferous shale; medium-gray clayey limestone at top. Buttermilk Falls Limestone: Clayey fossiliferous limestone containing layers of black chert; hard, fossiliferous clay ironstone; gray to black, massive clay shale.
Devonian and Silurian	Old Port Formation	Fine- to very coarse grained, light-gray sandstone; dark-gray shale and siltstone; medium- to medium-dark-gray, cherty limestone.
	Keyser and Tonoloway Formations	Dark-gray thick-bedded limestone.
	Wills Creek Formation	Greenish-gray thin-bedded shale; local limestone and sandstone; some red shale and red siltstone at bottom.
	Bloomsburg and Mifflintown Formations	Red sandstone and prominent red shales; greenish-gray shale containing thin layers of impure limestone.
	Clinton Group and Rose Hill Formation	Reddish to greenish-gray, fossiliferous shale; gray fossiliferous limestone; brown sandstone.
	Tuscarora and Shawangunk Formations	Gray thick-bedded sandstone and conglomerate.
Ordovician	Juniata Formation	Red shale and micaceous sandstone.
	Bald Eagle Formation	Thick-bedded sandstone; includes some red shale.
	Reedsville and Martinsburg Formations	Dark shale and thin layers of limestone.

VALLEY AND RIDGE PROVINCE APPALACHIAN MOUNTAIN SECTION



SYSTEM	ROCK UNIT	DESCRIPTION
Ordovician	Coburn Formation, Salona Formation, and Nealmont Formation	Dark-gray thin-bedded limestone; in part fossiliferous.
	Benner Formation, Valentine Member, Snyder Formation, Hatter Formation, and Loysburg Formation	Gray impure limestone (the Valentine is a high-calcium limestone).
	Beekmantown Group	
	Bellefonte Formation	Gray medium-bedded dense dolomite.
	Axemann Formation	Bluish-gray medium-bedded impure limestone.
	Nittany Formation	Light-gray thick-layered dolomite.
Cambrian	Stonehenge and Larke Formations	Thick-bedded dark-gray dolomite and thin sandstone layers.
	Gatesburg Formation	Bluish-gray dolomite containing sandstone interbeds.
	Mines Member	Bluish-gray dolomite; oolitic chert.
	Warrior Formation	Dark-gray limestone beds separated by shaly partings.
	Pleasant Hill Formation	Dark-gray thick-bedded limestone and thin-bedded shaly limestone.

ROCK STRUCTURE

Major folds extend the length of the section from south-central to northeastern Pennsylvania and are the dominant structures. Numerous smaller folds occur within the major folds, and even smaller folds can be found in individual outcrops. Faults make up a lesser part of the structure, and for the most part they are reverse faults that duplicate the rock sequence and produce lateral shortening and vertical extension of the folds. Fractures are common and tend to control the location of many tributary streams. The water and wind gaps are also probably due to erosion along zones of more intense fracturing of the rock layers.

179. ARCH ROCK

COUNTY: Juniata

TOWNSHIP: Fermanagh

QUADRANGLE: Mifflintown

LOCATION: In the village of Arch Rock along Arch Rock Road, approximately 2.5 miles north of Mifflintown.

REMARKS: An excellent exposure of an asymmetrical anticline in the Keefer Formation (thin-bedded sandstones and shales, Silurian age).

REFERENCE: Conlin, R. R., and Hoskins, D. M. (1962), *Geology and mineral resources of the Mifflintown quadrangle*, Pennsylvania Geological Survey, 4th ser., Atlas 126, 46 p.



VALLEY AND RIDGE PROVINCE
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ARCH ROCK

180. ARCH SPRING

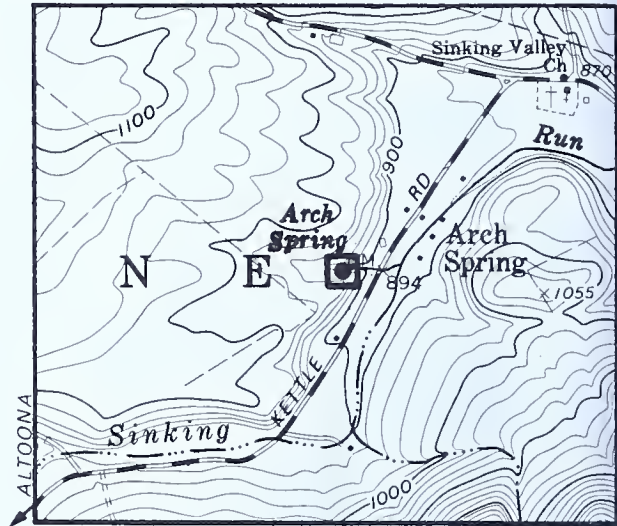
COUNTY: Blair

TOWNSHIP: Tyrone

QUADRANGLE: Spruce Creek

LOCATION: Southeast of Tyrone in Sinking Valley along Kettle Road.

REMARKS: A large sink-hole spring (median flow 8000 gallons per minute) and collapsed cave in the Loysburg Formation (Ordovician age). Water wells up in the center of the sink and exists via a natural bridge (arch) which is part of the former cave system; it is the eighth largest spring in Pennsylvania.



REFERENCES: Flippo, H. N., Jr. (1974), *Springs of Pennsylvania*, Department of Environmental Resources, Office of Resources Management, Water Resources Bulletin 10, 46 p.

Rogers, H. D. (1858), *The geology of Pennsylvania*, Pennsylvania Geological Survey, 1st ser., v. 1, 586 p.

VALLEY AND RIDGE PROVINCE
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181. ARCHBALD POTHOLE

COUNTY: Lackawanna

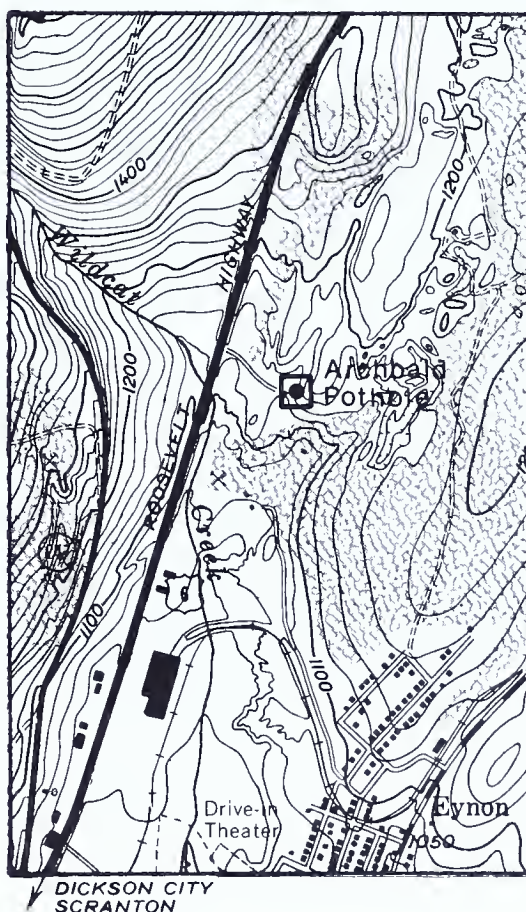
TOWNSHIP: Archbald

QUADRANGLE: Carbondale

LOCATION: Along U.S. Route 6, about 6 miles northeast of Scranton.

REMARKS: This is one of the world's largest known potholes; formed by swirling meltwater during the retreat of the Wisconsin ice sheet, it is 38 feet deep and 42 feet in diameter.

REFERENCE: McGlade, W. G. (1969), *Archbald Pothole State Park: Archbald Pothole*, Pennsylvania Geological Survey, 4th ser., Park Guide 3.



182. ASHLAND ANTICLINE

COUNTY: Columbia

TOWNSHIP: Conyngham

QUADRANGLE: Ashland

LOCATION: Approximately 1200 feet north of the northeast corner of Ashland Borough boundary; 0.8 mile south of Pa. Routes 61 and 54 in the center of the Borough of Centralia; within 600 feet of the Columbia-Schuylkill County line.

REMARKS: One of the best, if not the best, example of a tight anticline and syncline in the anthracite basin. These folds are located in, and are part of, the northern limb of the Western Middle synclinorium in the Western Middle Anthracite field; the Mammoth coal beds (no. 8 and no. 9) are involved in the folds.



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



REFERENCES:

- Arndt, H. H. (1971), *Geologic map of the Ashland quadrangle, Columbia and Schuylkill Counties, Pennsylvania*, U. S. Geological Survey Geologic Quadrangle Map GQ-918.
- Haley, B. R., Arndt, H. H., Rothrock, H. E., and Wagner, H. C. (1953), *Geology of anthracite in the western part of the Ashland quadrangle, Pennsylvania*, U.S. Geological Survey Coal Investigations Map C-13.

NOTES:

183. BAKE OVEN KNOB

COUNTY: Lehigh

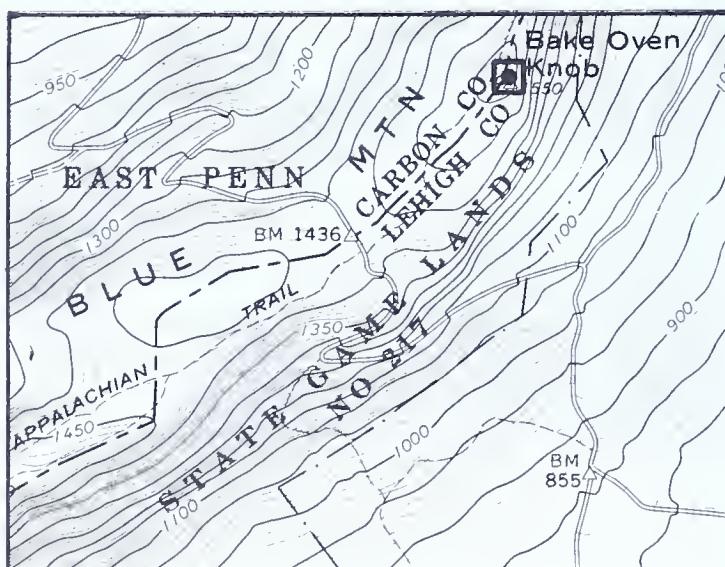
TOWNSHIP: Heidelberg

QUADRANGLE: Slatedale

LOCATION: Approximately 6 miles northwest of Slatedale.

REMARKS: An outcrop of the Tuscarora quartzite (Silurian age) forms the highest observation point in Lehigh County, 1600 feet above sea level. The knob rises about 50 feet above the even crest of Blue Mountain and affords a view southward over the Lehigh Valley and northward over a series of ridges and valleys in Carbon and Schuylkill Counties. The knob was named after a peculiar bowl-shaped topographic feature that resembles an old-fashioned bake oven. The Appalachian Trail, extending from Maine to Georgia, passes near Bake Oven Knob.

- REFERENCES: Berlin, A. F. (1922), *The Bake Oven Knob*, Lehigh County Historical Society, Proceedings 1922, p. 44-48.
- Miller, B. L., Fraser, D. M., Miller, R. L., and others (1941), *Lehigh County, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., County Report 39, 492 p.



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



NOTES:

184. BALD EAGLE LOOKOUT (SKYTOP)

COUNTY: Centre

TOWNSHIP: Huston

QUADRANGLE: Julian

LOCATION: Along U. S. Route 322, 8 miles north of the Borough of State College.

REMARKS: A lookout on the crest of Bald Eagle Mountain; a breathtaking view of Bald Eagle Valley and the Allegheny Front, the junction of the Valley and Ridge province and the Appalachian Plateaus province.

REFERENCE: Willard, Bradford, Conlin, Richard, and Hoskins, D. M. (1958), *Guide to the highway geology from Harrisburg to Bald Eagle Mountain, Pennsylvania Geological Survey, 4th ser., General Geology Report 29, 38 p.*



BALD EAGLE VALLEY IN CENTER OF PHOTOGRAPH; ALLEGHENY FRONT IN BACKGROUND; VIEW LOOKING NORTH

186. BEARS ROCKS

COUNTIES: Lehigh and Schuylkill TOWNSHIPS: Lynn (Lehigh County); Penn (Schuylkill County)

QUADRANGLE: New Tripoli

LOCATION: Located on the crest of Blue Mountain in north-eastern Lynn Township and southwestern Penn Township.

REMARKS: An outcrop of the Tuscarora quartzite (Silurian age) forms three large blocks standing in a row; is said to have housed many bears.

The Tuscarora Formation underlies Blue Mountain and is the hardest rock found in the region and the most resistant to erosion. This accounts for the relatively great height of Blue Mountain compared with the Great Valley. The Tuscarora quartzite is composed of rounded quartz grains firmly cemented by silica.

REFERENCE: Miller, B. L., Fraser, D. M., Miller, R. L., and others (1941), *Lehigh County, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., County Report 39, 492 p.



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



187. BIG KETTLE

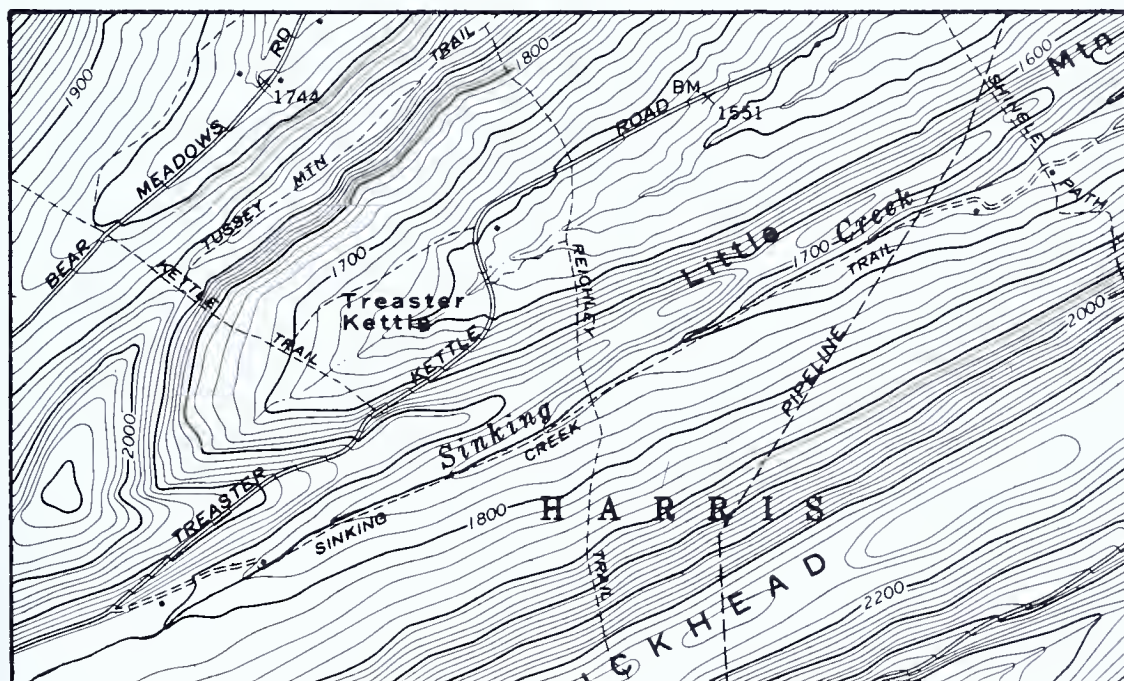
COUNTY: Huntingdon

TOWNSHIP: Jackson

QUADRANGLE: Barrville

LOCATION: Five miles northwest of the village of Kishacoquillas and Pa. Route 655; within Rothrock State Forest and east of the Alan Seeger Natural Area.

REMARKS: An eroded plunging anticline of Tuscarora quartzite (Silurian age) has a large topographic basin (Big Kettle) on the lee side of the plunging "nose." **Treaster Kettle** (188) and **Little Kettle** (189) are similar features nearby. **Chestnut Spring** (190) and **Ross Spring** (191) issue from the base of the quartzite ridges; springs are common in the Kishacoquillas Valley south of Big Kettle.



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



192. BIG KNOB

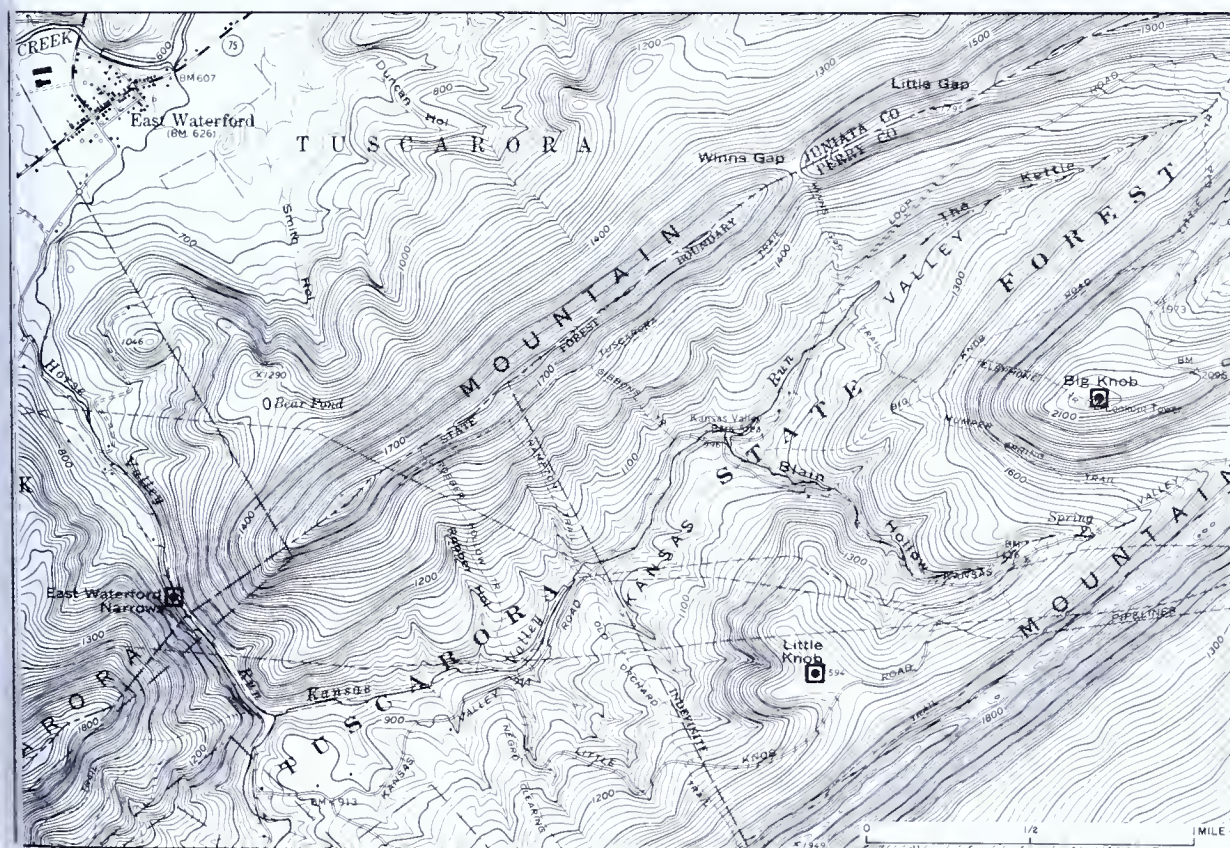
COUNTY: Perry

TOWNSHIP: Jackson

QUADRANGLE: Blain

LOCATION: Three miles southeast of the village of East Waterford and Pa. Route 75; within the Tuscarora State Forest on Kansas Valley Road.

REMARKS: The hard, resistant Tuscarora quartzite (Silurian age) underlies Big Knob and forms the high peak; the site affords an excellent view of the Folded Appalachian Mountains. **Little Knob** (193) is a similar feature nearby. **East Waterford Narrows** (194) through Tuscarora Mountain is created by the erosion of Horse Valley Run.



195. BIG SPRING

COUNTY: Centre

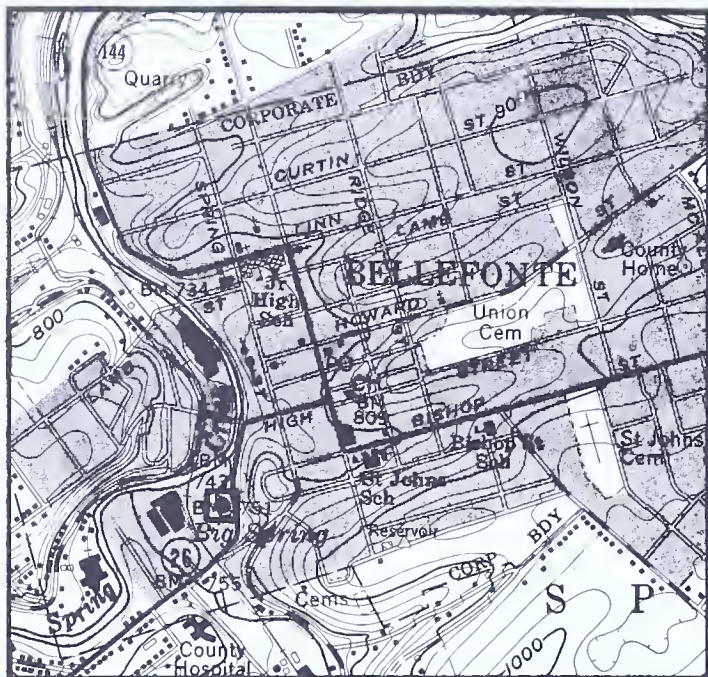
QUADRANGLE: Bellefonte

BOROUGH: Bellefonte

LOCATION: Borough of Bellefonte,
southwest corner.

REMARKS: The spring was presented to Bellefonte Borough in October 1879 by Mayor William F. Reynolds. The median flow is 8000 gallons per minute from limestones and dolomites of the Axemann and Bellefonte Formations (Ordovician age). It is the ninth largest spring in Pennsylvania and is presently used as a public and industrial water supply.

REFERENCE: Flippo, H. N., Jr. (1974), *Springs of Pennsylvania*, Department of Environmental Resources, Office of Resources Management, Water Resources Bulletin 10, 46 p.



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



196. BLUE KNOB

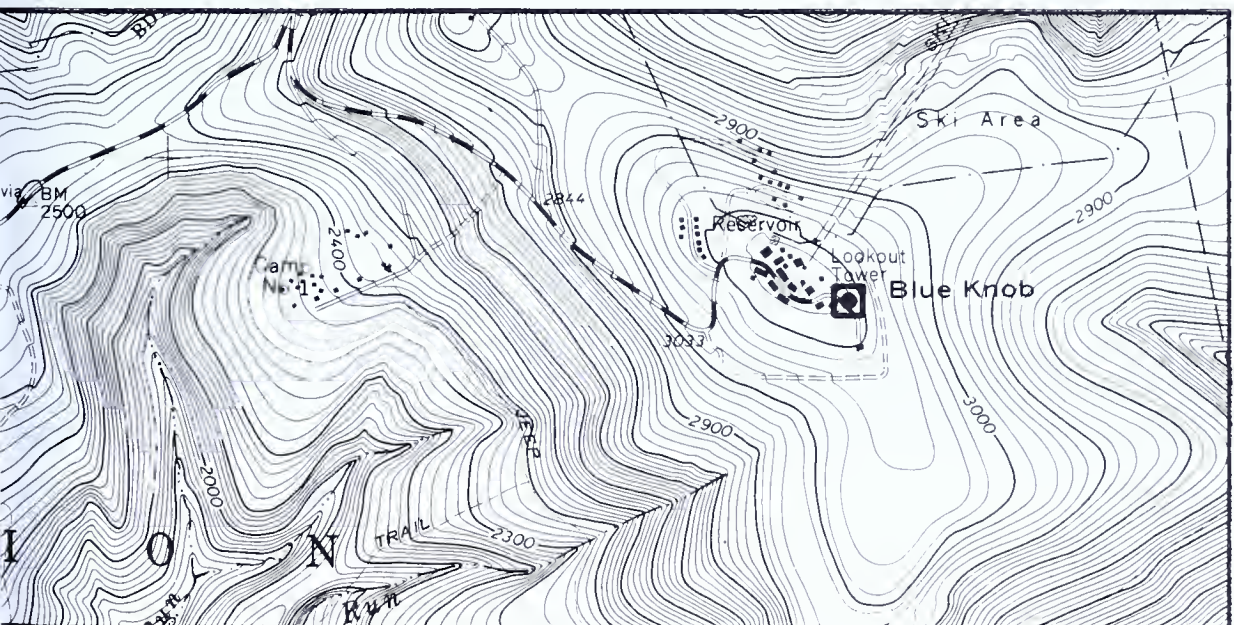
COUNTY: Bedford

TOWNSHIP: Union

QUADRANGLE: Blue Knob

LOCATION: Pa. Route 869 at the village of Pavia; the summit and surrounding area are within Blue Knob State Park.

REMARKS: The second highest peak (elevation 3146 feet above sea level) in Pennsylvania. The lookout tower at the summit has been removed, but numerous lookouts are provided throughout the park; a balanced rock is also present near the summit. At the base of the mountain gently dipping red siltstones and shales of the Catskill Formation (Devonian age) may be seen along the roads and trails. Near and at the summit of Blue Knob, outcrops of gray-green conglomerate of the same formation are found. The conglomerate is far more resistant to weathering than the shales and siltstones, and therefore remains as a peak (Blue Knob) above the surrounding countryside.



197. BLUE ROCKS BLOCK FIELD

COUNTY: Berks

TOWNSHIPS: Greenwich and Albany

QUADRANGLE: Hamburg

LOCATION: Two miles northwest of Lenhartsville.

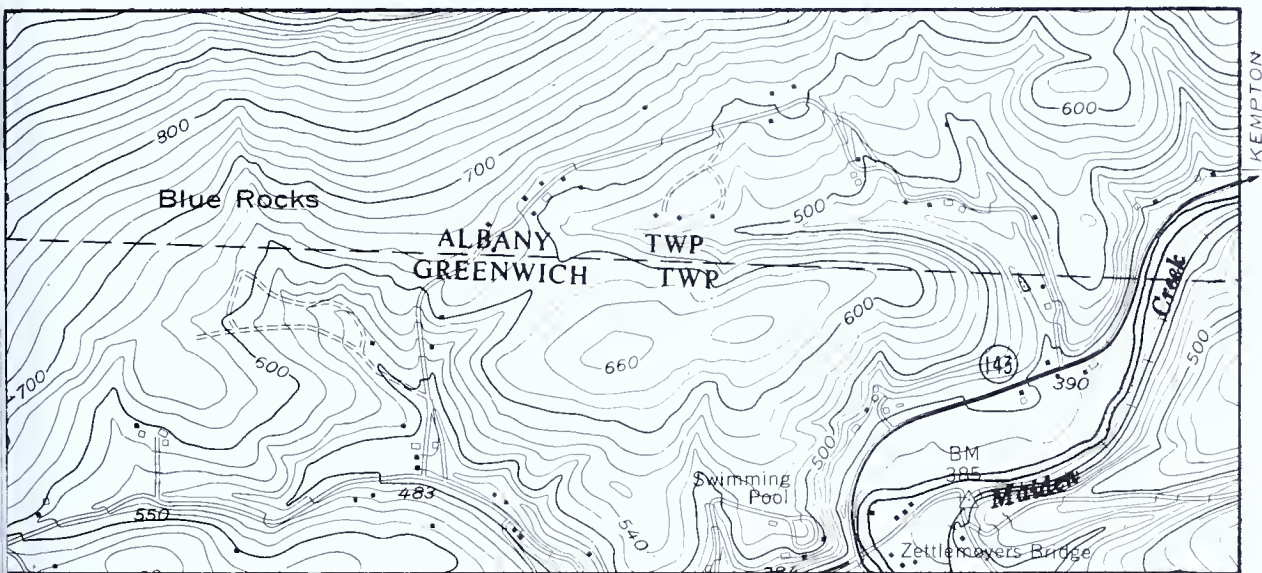
REMARKS: A long narrow "train" of angular blocks (often called a boulder field), about one-half mile long and ranging in width from 200 to 600 feet, on the southern slope of Blue Mountain. It was formed by solifluction or creep in the periglacial climate of the Wisconsin glacial, after which removal of fine-grained material occurred. Blue Rocks and adjacent rubble deposits closely resemble solifluction sheets in Alaska.



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



REFERENCE: Potter, Noel, Jr., and Moss, J. H. (1968), *Origin of the Blue Rocks Block Field and adjacent deposits, Berks County, Pennsylvania*, Geological Society of America Bulletin, v. 79, p. 255-262.



NOTES:

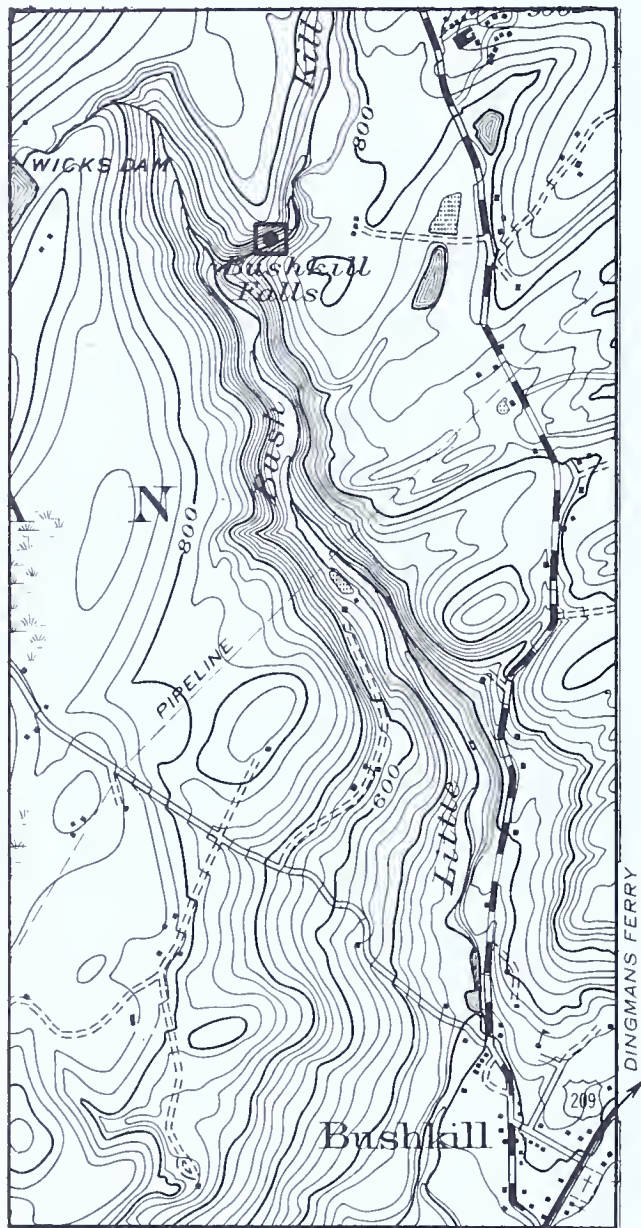
198. BUSHKILL FALLS

COUNTY: Pike

TOWNSHIP: Lehman

QUADRANGLE: Bushkill

LOCATION: One and one-half miles north of the Borough of Bushkill, along Little Bushkill Creek.



REMARKS: Referred to as the "Niagara of Pennsylvania." An upper canyon and lower gorge on Little Bushkill Creek contain the main falls and several smaller ones; the main falls is approximately 100 feet high. Three more falls are on a tributary (Pond Run Creek) that enters Little Bushkill Creek below the lower gorge. The main falls and many of the smaller ones are in the upper member of the Mahantango Formation (Devonian age), a medium-dark-gray coarse-grained thin-bedded siltstone and silty shale at this location. Bushkill Falls is one of the East's most famous scenic geological attractions. The falls was first opened to the public in 1904 by Charles E. Peters. Today it is owned by the estate of Charles E. Peters and operated commercially by Harry M. Stevens, Inc., of Pennsylvania, from April 1 to November 1, daily from 8:00 a.m. to dark.

REFERENCE: Alvord, D. C., and Drake, A. A., Jr. (1971), *Geologic map of the Bushkill quadrangle, Pennsylvania-New Jersey*, U. S. Geological Survey Geologic Quadrangle Map GQ-908.

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



199. BUTLER KNOB

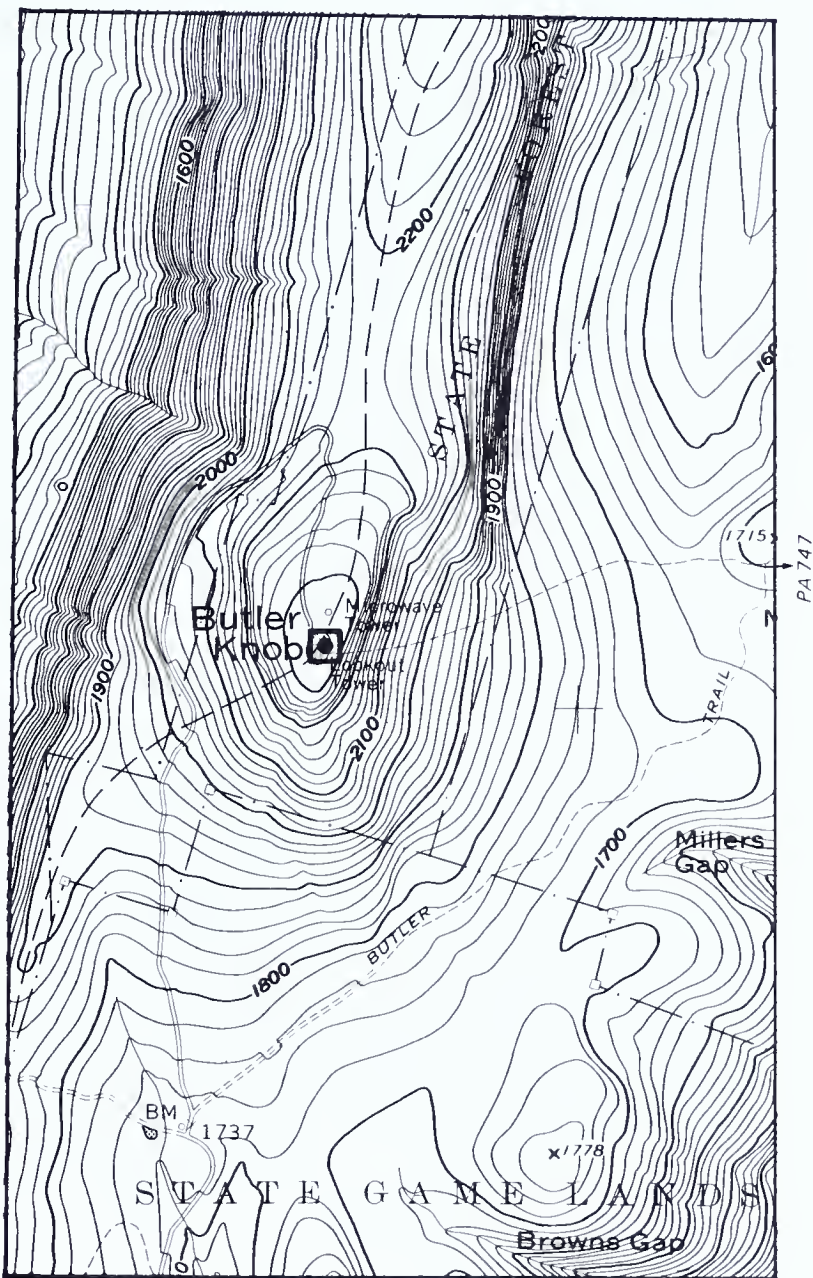
COUNTY: Huntington

TOWNSHIP: Cass

QUADRANGLE: Butler Knob

LOCATION: Four and eight-tenths miles west of Shirleysburg and U. S. Route 522; on Jacks Mountain; within state forest land.

REMARKS: This "knob," an erosional feature of the weather-resistant quartzite of the Tuscarora Formation (Silurian age), is one of the highest topographic locations in the county. It provides an excellent view of the Appalachian Mountain section topography.



200. CAMPBELL LEDGE (DIAL ROCK)

COUNTY: Luzerne

TOWNSHIP: Pittston

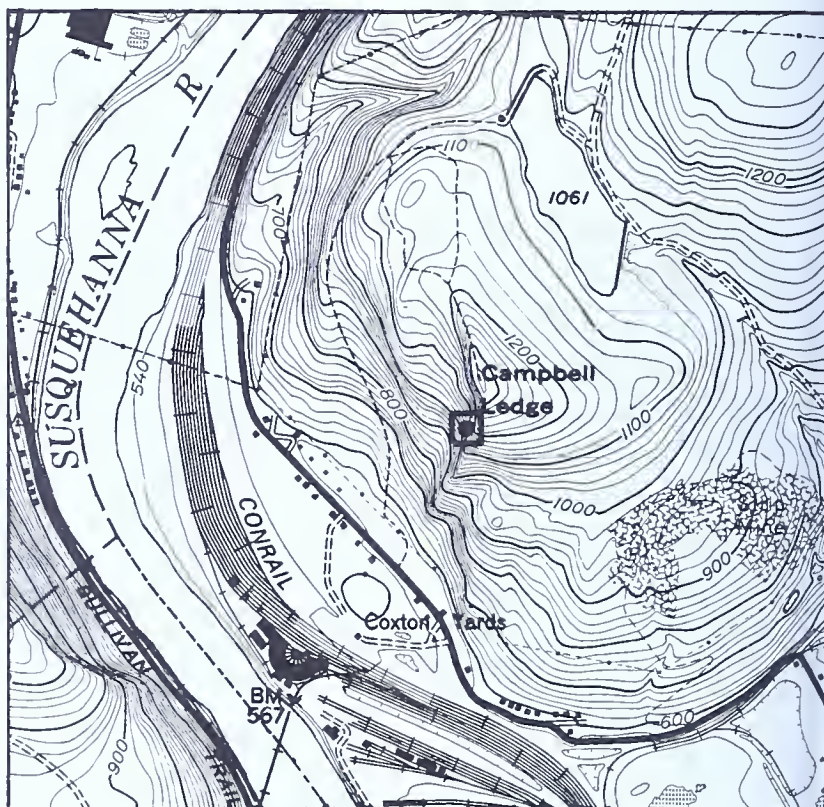
QUADRANGLE: Pittston

LOCATION:

Two and one-half miles north of the Borough of Pittston; on the east bank of the Susquehanna River.

REMARKS:

A 600-foot vertical cliff of Pocono conglomerate (Mississippian age) is exposed in the water gap.



The L-shaped cliff is unusual and may have been formed by the Susquehanna River at a former elevation and earlier geologic time. This feature was known as **Dial Rock**. A rock projection on the cliff faces southwest, and the Indians learned that when the sun touched the rock it was noon. Settlers in the valley also used the Indians' timepiece.

REFERENCE:

Faris, J. T. (1919), *Seeing Pennsylvania*, Philadelphia, J. B. Lippincott Company, 350 p.

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



NOTES:

201. CASTLE ROCKS

COUNTY: Clinton

TOWNSHIP: Crawford

QUADRANGLE: Carroll



CASTLE ROCKS

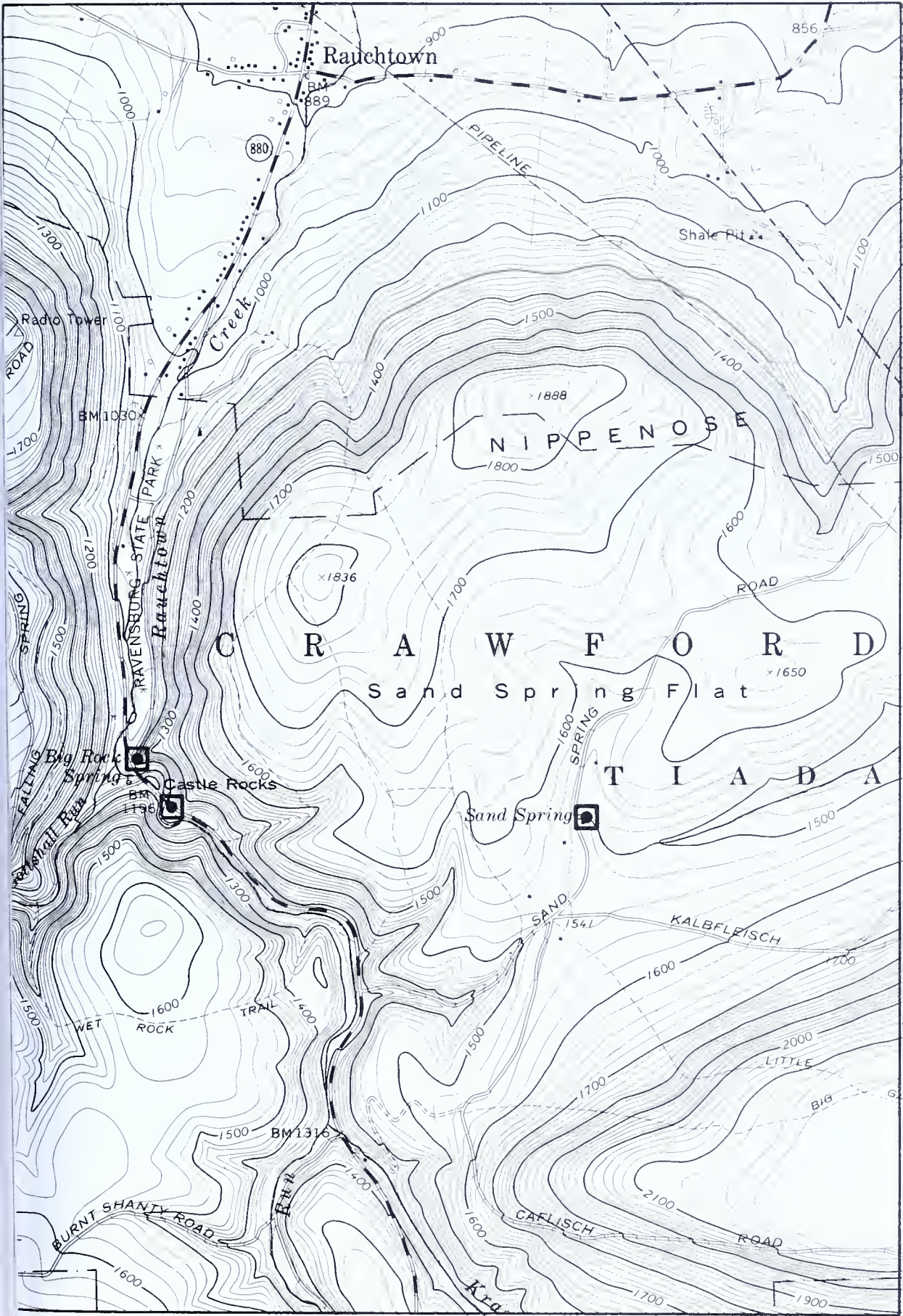
LOCATION: Approximately 2 miles south of Rauchtown on Pa. Route 880; 2.5 miles north of Interstate 80; within Ravensburg State Park.

REMARKS: A scenic gorge along Rauchtown Creek contains spires of rock (Bald Eagle conglomerate, Ordovician age) forming the feature called "Castle Rocks." **Big Rock Spring** (202) and **Sand Spring** (203) are nearby.



BIG ROCK SPRING

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



204. CELESTINE LOCALITY

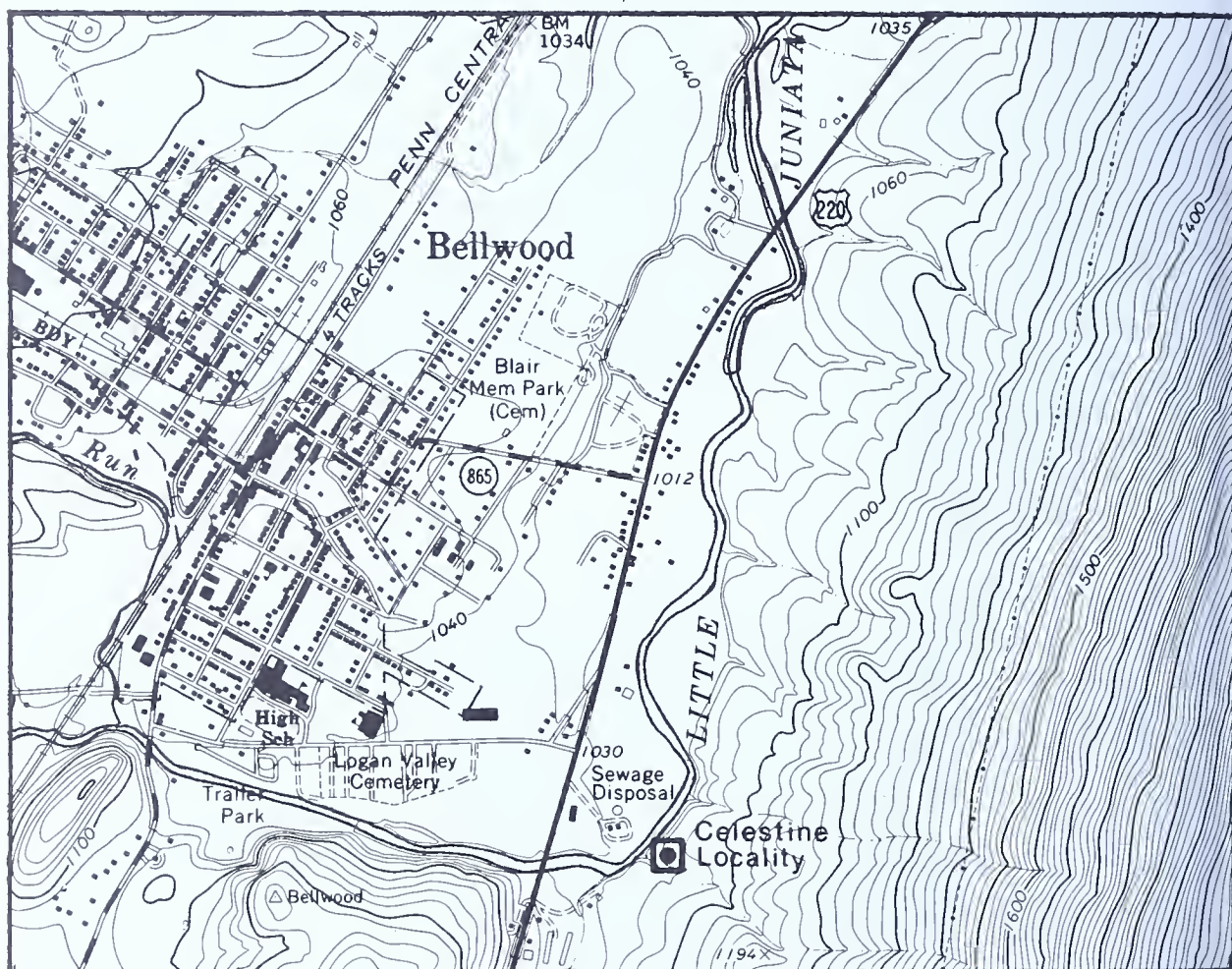
COUNTY: Blair

TOWNSHIP: Antis

QUADRANGLE: Bellwood

LOCATION: Near the village of Bellwood.

REMARKS: The mineral occurs in layers of irregular thickness in a hard calcareous shale of the Tonoloway Formation (Silurian age). This is the locality where this mineral was first discovered, described, and named.



- REFERENCES: Klaproth, M. H. (1797), *Chemische untersuchung des Schwefelsauren strontianits, aus Pensilranien*, Beiträge zur Chemischen Kenntniss Der Mineralkörper, Berlin, v. 2, p. 92-98.
- Mangus, M. D. (1946), *The type locality of celestite*, M. S. thesis, The Pennsylvania State University, University Park, Pennsylvania.
- Young, C. A. (1875), *The occurrence of celestine in Blair County, Pennsylvania*, Academy of Natural Sciences of Philadelphia, Proceedings, no. 28, p. 127-128.

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



205. CHIMNEY ROCKS



COUNTY: Blair

TOWNSHIP: Frankstown

QUADRANGLE: Hollidaysburg

LOCATION: Adjacent to
Pa. Route 36 near the
Borough of Hollidays-
burg.

REMARKS: Vertical beds
of the Silurian Tonol-
oway Limestone form
three finger-like projec-
tions skyward.



206. CHINESE WALL

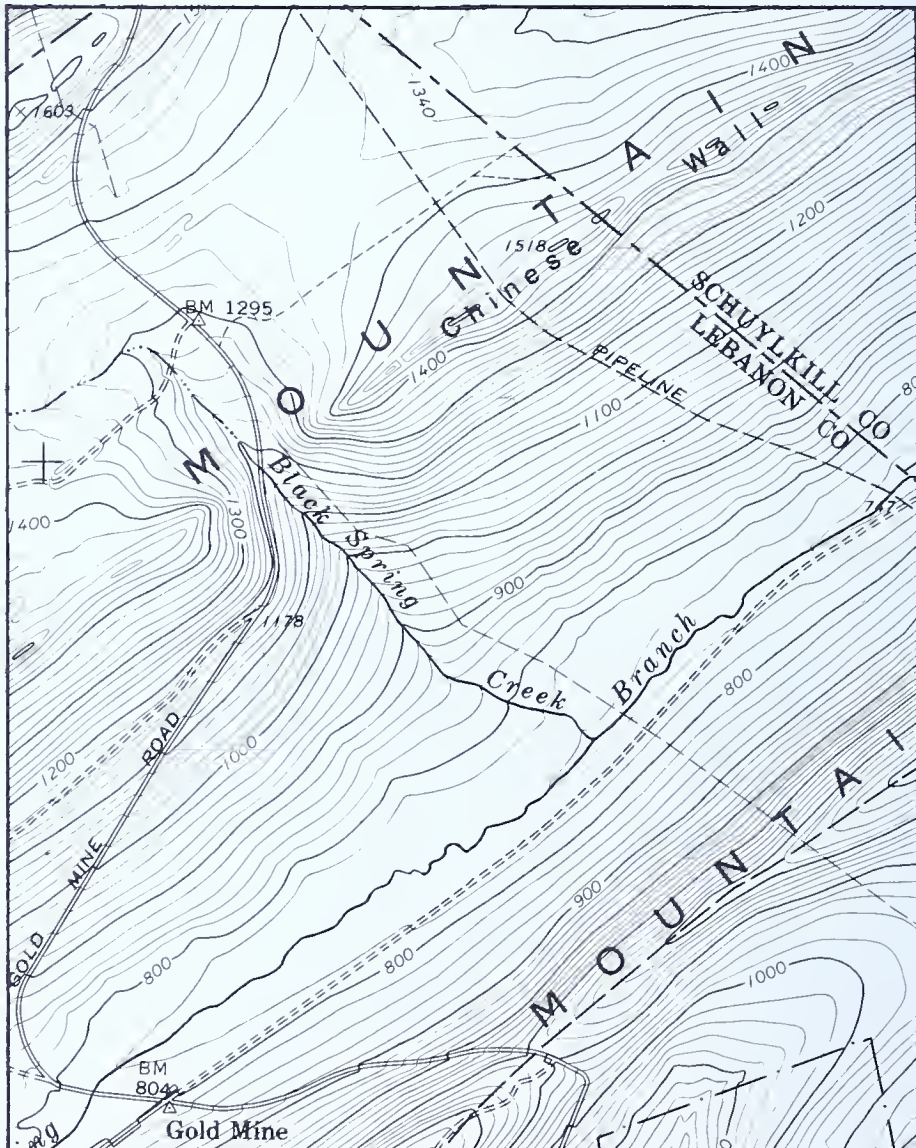
COUNTY: Lebanon

TOWNSHIP: Cold Spring

QUADRANGLE: Tower City

LOCATION: Included within Pennsylvania State Game Lands No. 211 on the crest of Sharp Mountain.

REMARKS: A spectacular "wall" of outcrop of Sharp Mountain quartz-pebble conglomerate (Pottsville Group, Pennsylvanian age). The "wall" has also been known as **High Rocks** and **Boxcar Rocks**.



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



207. CONCORD NARROWS

COUNTIES: Juniata, TOWNSHIPS: Lack (Juniata County);
Huntingdon, Tell (Huntingdon
and Franklin County); Fannett
 (Franklin County)

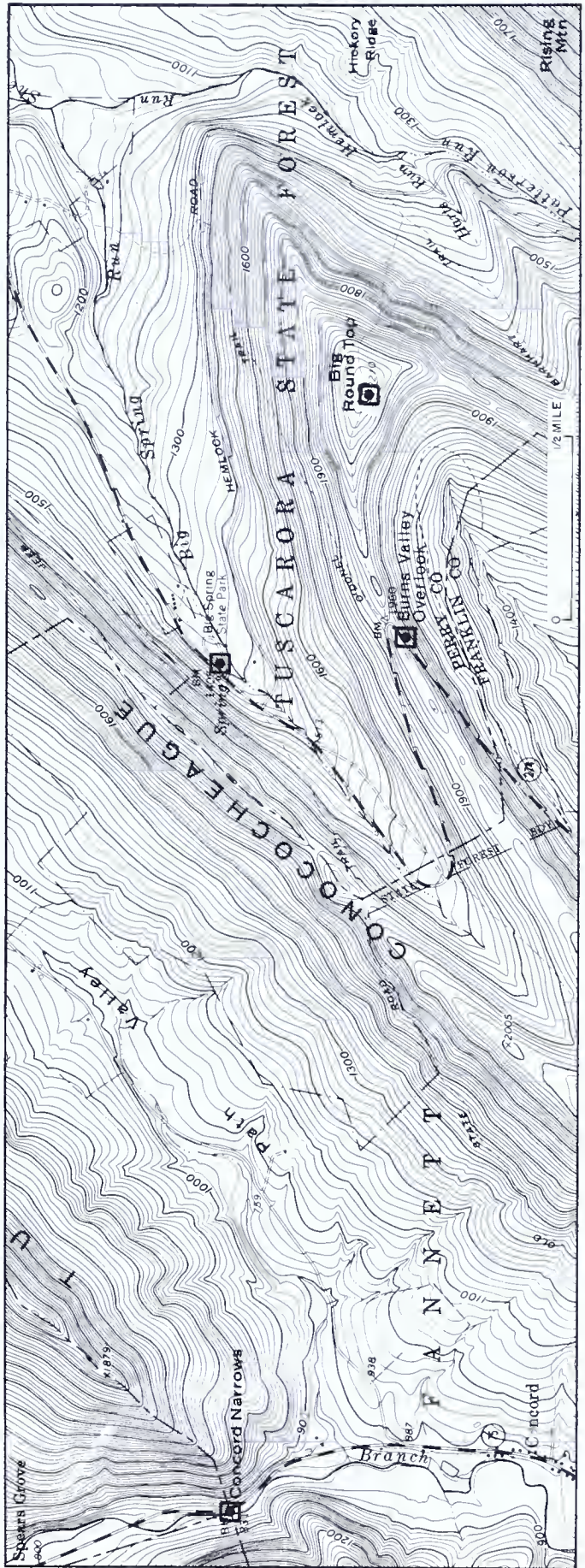
QUADRANGLE: Blairs Mills

LOCATION: At the intersection of Juniata, Huntingdon, and
Franklin County boundaries; along Pa. Route 75
at Tuscarora Mountain.

REMARKS: A water gap through Tuscarora Mountain is
narrow and scenic; talus slopes of Tuscarora
quartzite (Silurian age) flank the gap to the
edges of the highway. **Big Round Top** (208), a
nearby geologic feature in Perry County, is an
erosional remnant of the Tuscarora quartzite
atop Conococheague Mountain. **Burns Valley
Overlook** (209) is on Pa. Route 274 at the crest
of Conococheague Mountain. **Big Spring** (210),
in Big Spring State Park, is at the base of the
mountain.



VALLEY AND RIDGE PROVINCE
 APPALACHIAN MOUNTAIN SECTION



211. COUNCIL CUP SCENIC OVERLOOK

COUNTY: Luzerne

TOWNSHIP: Hollenback

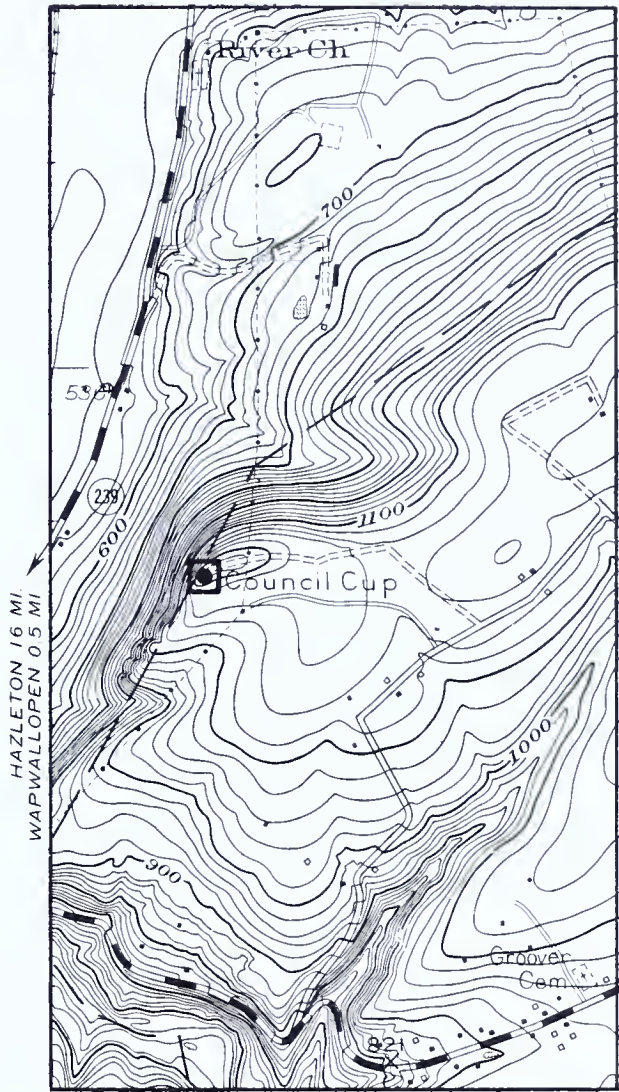
QUADRANGLE: Sybertsville

LOCATION: Northeast of Wapwallopen 0.8 mile on Hess Mountain; a Pennsylvania Power and Light Company recreation facility; directly across the Susquehanna River from P P & L's nuclear electrical generating station; the recreation area and overlook are open from 8:00 a.m. to sunset.

REMARKS: A high bluff overlooking the Susquehanna River. The site has been developed as an overlook and the area from the overlook to the base of the cliff has been designated as a natural area. Mudstones and siltstones of the Trimmers Rock Formation (Devonian age) form the scenic cliff.



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



212. DEER LAKE FOSSIL SITE

COUNTY: Schuylkill

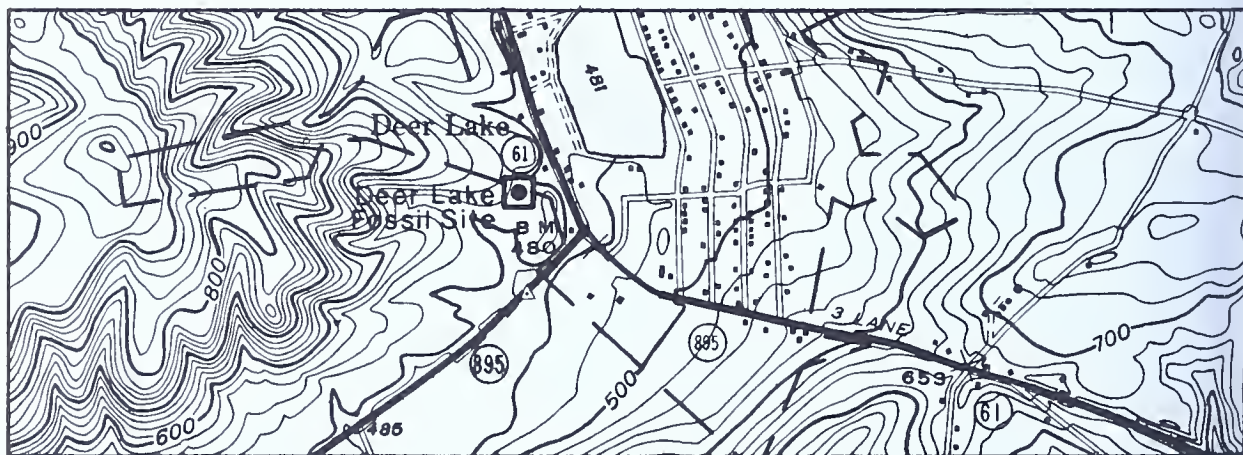
BOROUGH: Deer Lake

QUADRANGLE: Auburn

LOCATION: On Pa. Route 61 in the Borough of Deer Lake.

REMARKS: The Mahantango Formation (Devonian age) contains brachiopods, gastropods, pelecypods, cephalopods, trilobites, coelenterates, and plants. Specimens found include the rare coelenterate, *Conularia*; the gastropod, *Buchanopsisleda* (Hall); and the simple ammonoid, *Agoniatites vanuxemi* (Hall). This site has one of the most varied assemblages and is especially noteworthy for containing varieties.

REFERENCES: Hoskins, D. M. (1969), *Fossil collecting in Pennsylvania*, Pennsylvania Geological Survey, 4th ser., General Geology Report 40, 2nd printing, revised, p. 94.
Palmer, A. C. (1977), *Rare fossils in Schuylkill County*, Pennsylvania Geology, v. 8, no. 4, p. 30-32.



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



NOTES:

213. DELAWARE WATER GAP

COUNTY: Monroe

BOROUGH: Delaware Water Gap

QUADRANGLES: Stroudsburg and Portland

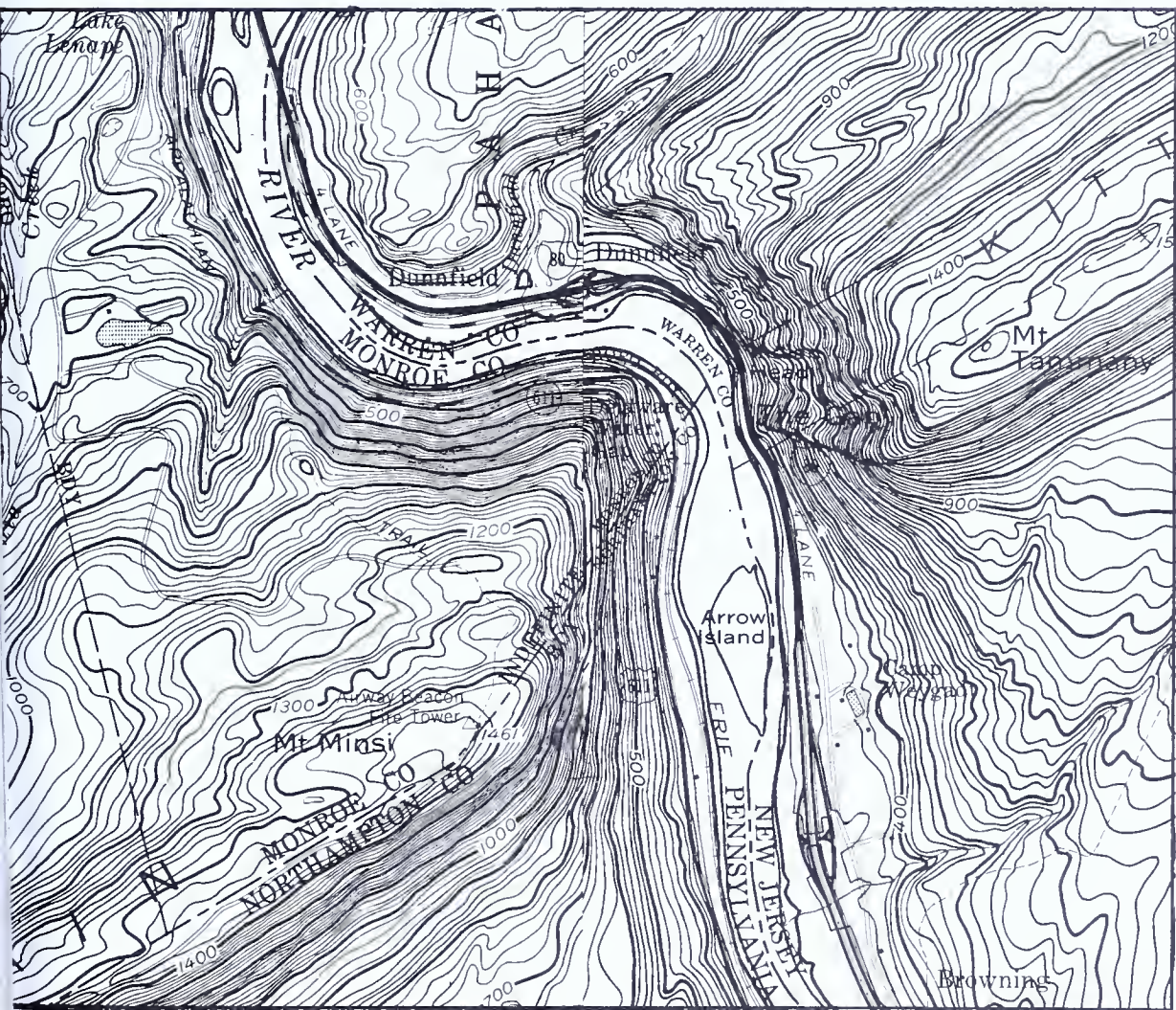
LOCATION: Within the Borough of Delaware Water Gap and just south of the toll bridge on Interstate 80 over the Delaware River.

REMARKS: A highly scenic water gap cut by the Delaware River through Kittatinny Mountain; the most attractive in the United States. Massive gray conglomerate and sandstone of the Shawangunk Formation of Silurian age supports the ridges and forms cliffs.

REFERENCES: Epstein, J. B. (1966), *Structural control of wind gaps and water gaps and of stream capture in the Stroudsburg area, Pennsylvania and New Jersey*, U. S. Geological Survey Professional Paper 550-B, p. 80-86.
Willard, Bradford (1938), *A Paleozoic section at Delaware Water Gap, Pennsylvania* Geological Survey, 4th ser., General Geology Report 11, 35 p.



VALLEY AND RIDGE PROVINCE
 APPALACHIAN MOUNTAIN SECTION



214. DEVILS POTATO PATCH

COUNTY: Northampton

TOWNSHIP: Lehigh

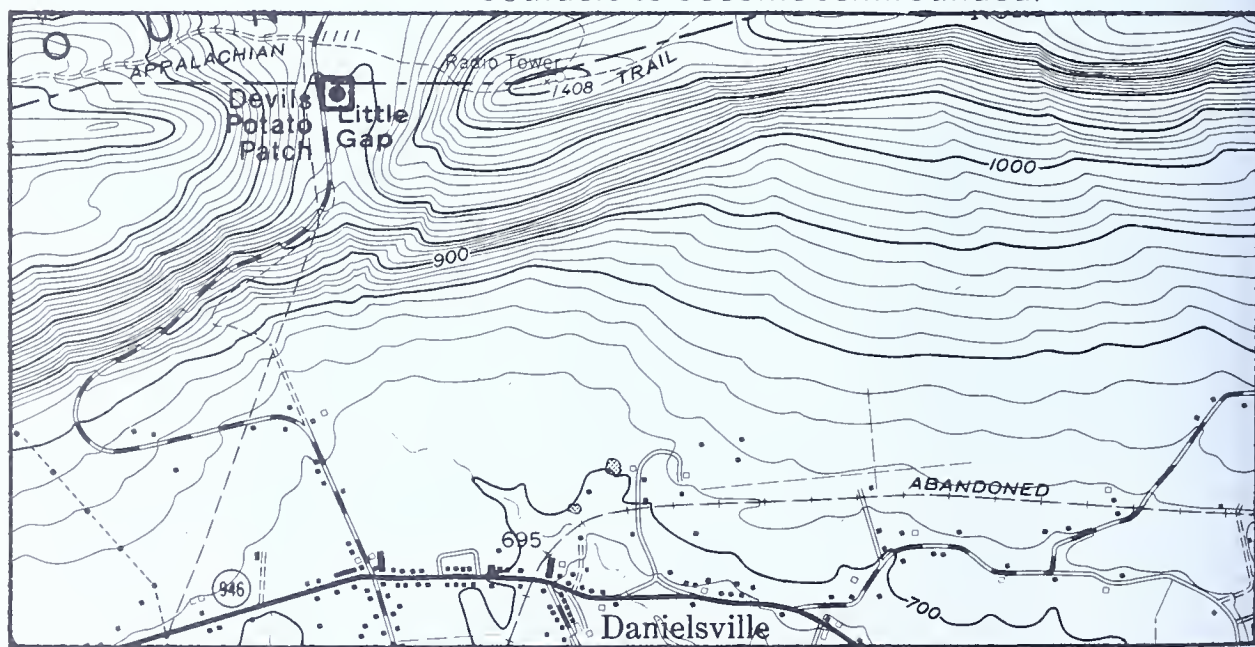
QUADRANGLE: Palmerton

LOCATION: On Blue Mountain; within State Game Lands No. 168; at Little Gap.



REMARKS:

A boulder field of large angular rocks. The field contains boulders of sandstone and conglomerate of the Shawangunk Formation (Silurian age), and occupies a relatively flat area in the center of a wind gap in Blue Mountain. Shawangunk sandstone from the sides of this gap represents the source for all of the material in the field. During glacial times repeated break-up of the rock by frost action on these nearby ridges resulted in a pile of angular boulders at the base; continued movement during glacial time to where they rest today has caused the boulders to become semirounded.



REFERENCE:

Miller, B. L., Frazer, D. M., and Miller, R. L. (1939), *Northampton County, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., County Report 48, 496 p.

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



215. DEVILS RACE COURSE

COUNTY: Dauphin

TOWNSHIP: Middle Paxton

QUADRANGLE: Enders

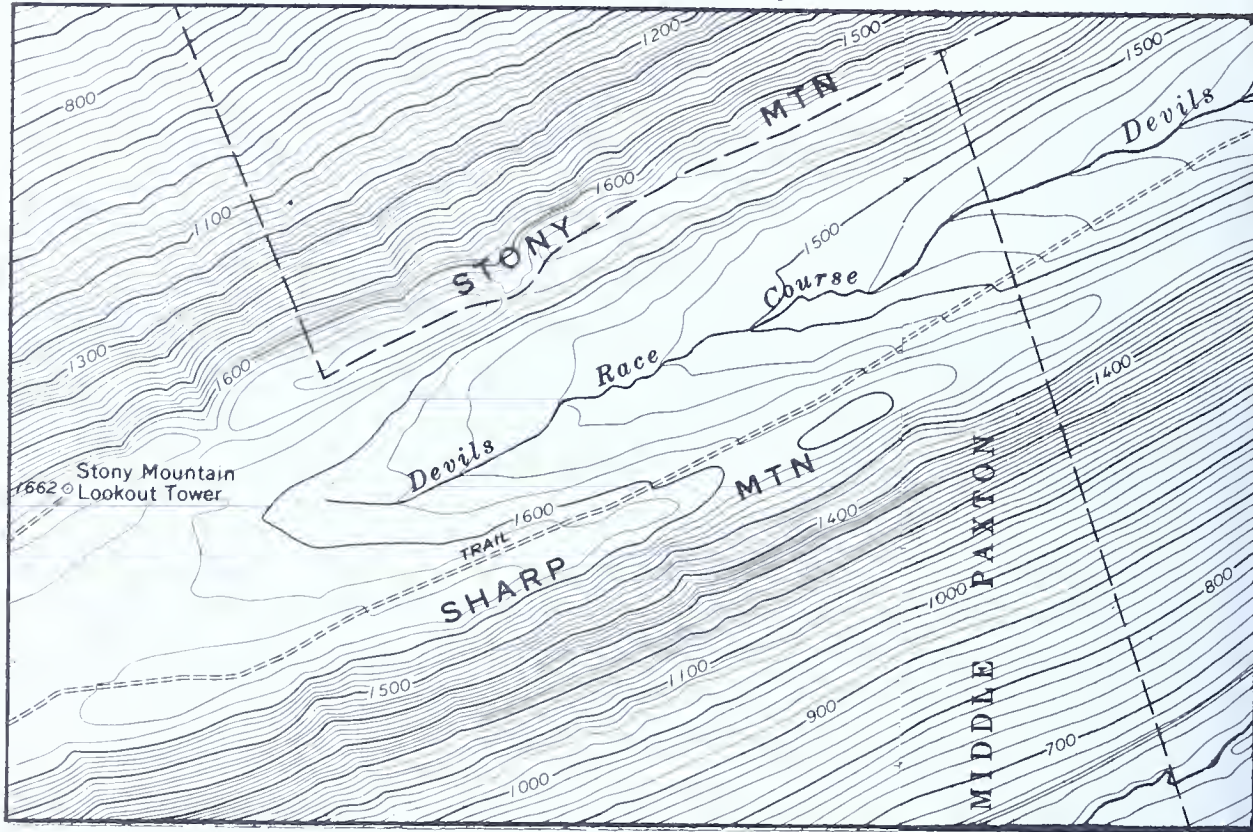
LOCATION: Thirteen miles northeast of Harrisburg.

REMARKS: An undisturbed relic of a former periglacial climate, 40 yards by 1140 yards in area, having a gradient from 1.5 to 4.5 degrees. The field is composed of subangular boulders of Pottsville conglomerate and sandstone (Pennsylvanian age) derived from adjacent ridges of Sharp and Stony Mountains.

REFERENCE: Martin, R. A. (1971), *Geology of the Devil's Racecourse Boulderfield, Dauphin County, Pennsylvania*, M. S. Thesis, Millersville State College, Millersville, Pennsylvania, 27 p.



215. **DEVILS RACE COURSE** (continued)



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



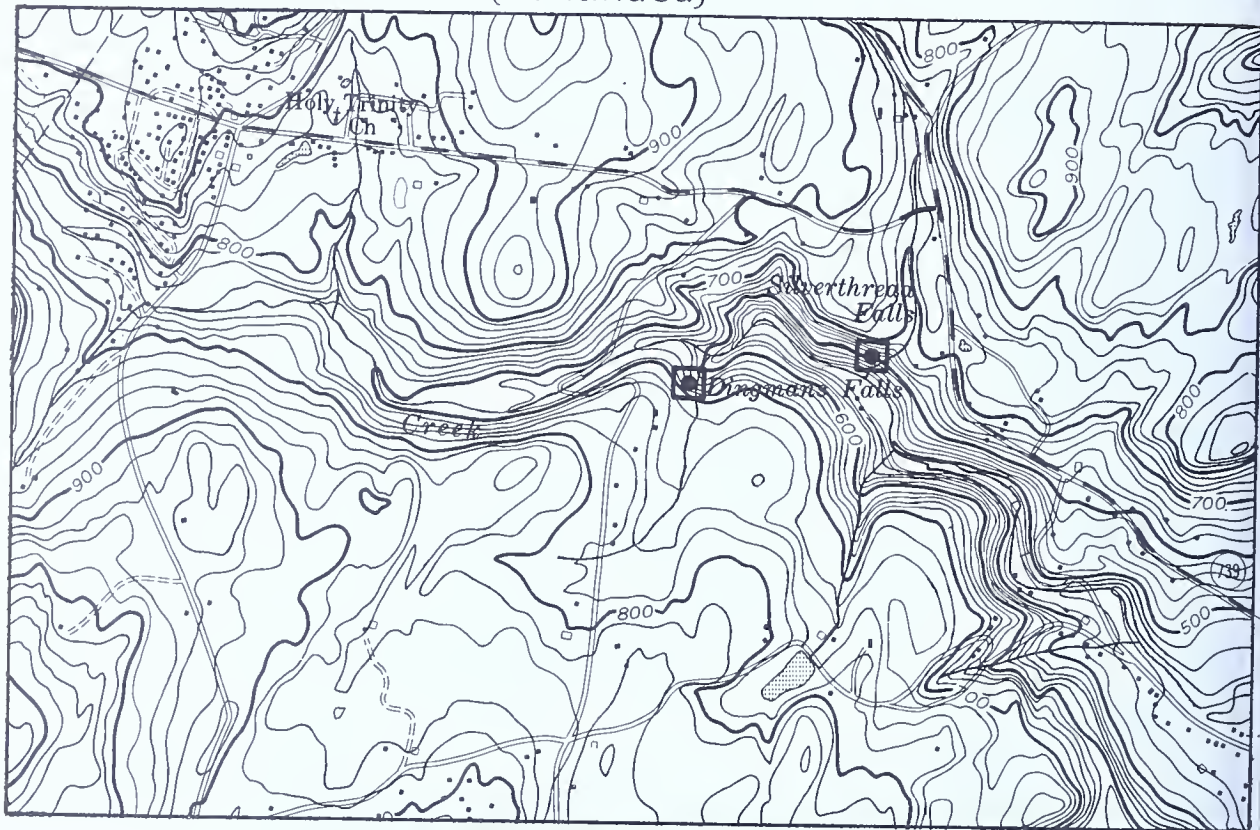
216. DINGMANS FALLS

- COUNTY: Pike TOWNSHIP: Delaware
- QUADRANGLE: Lake Maskenozha
- LOCATION: At the village of Dingmans Ferry on U. S. Route 209; within the U. S. Park Service Delaware Water Gap National Recreation Area.
- REMARKS: The highest falls in Pennsylvania; water cascades over flat-lying beds of Mahantango shales, siltstones, and sandstones (Devonian age). **Silverthread Falls** (217) occurs in a narrow rock fracture; highly scenic.



SILVERTHREAD FALLS

216. DINGMANS FALLS (continued)



DINGMANS FERRY 0.7 MI



DINGMANS FALLS



218. FLAGSTAFF MOUNTAIN OVERLOOK

COUNTY: Carbon

BOROUGH: Jim Thorpe

QUADRANGLE: Lehighton

LOCATION: Approximately 1 mile south of the business district of Jim Thorpe on Mauch Chunk Ridge; within Flagstaff Mountain Park.

REMARKS: One of the most spectacular views in Pennsylvania. Folded ridges and valleys cut by the Lehigh River result in wild and scenic gorges. The overlook owes its origin to large outcrops of Catskill sandstone and conglomerate (Devonian age) in Mauch Chunk Ridge.

REFERENCE: Epstein, J. B., Sevon, W. D., and Glaeser, J. D. (1974), *Geology and mineral resources of the Lehighton and Palmerton quadrangles, Carbon and Northampton Counties, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Atlas 195cd, 460 p.



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



219. GOBBLERS KNOB

COUNTY: Fulton

TOWNSHIP: Dublin

QUADRANGLE: Burnt Cabins

LOCATION: Two and one-half miles west of the village of Burnt Cabins; 2.5 miles north of interchange 13 of the Pennsylvania Turnpike.

REMARKS: Of the many topographic-geologic features named "Gobblers Knob" in Pennsylvania, this one, underlain by the Tuscarora quartzite (Silurian age), is perhaps the most prominent. **Sidneys Knob** (220) is a similar feature nearby.



221. HAWK MOUNTAIN LOOKOUTS

COUNTIES: Berks and
Schuylkill

TOWNSHIPS: Albany (Berks County); East Brunswick
(Schuylkill County)

QUADRANGLE: New Ringgold

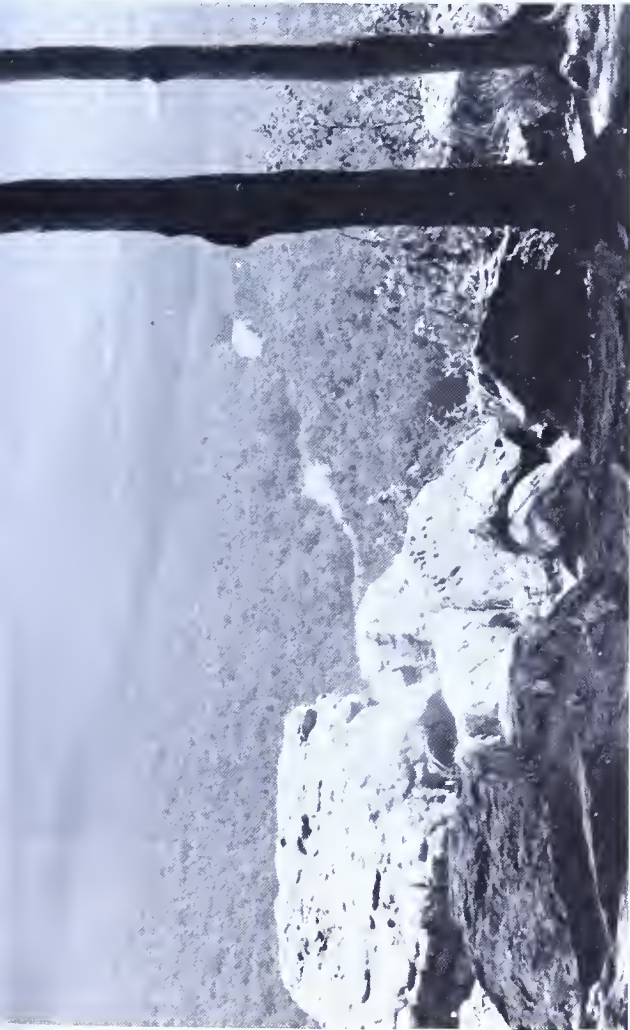
LOCATION: One and three-tenths miles east of Dreherstown on Blue Mountain; the area is included in the Hawk Mountain Sanctuary, a privately maintained refuge.

REMARKS: Several outstanding geologic features are present in the immediate area: the **North Lookout** (222) on Hawk Mountain and **Dans Pulpit** (223) on Blue Mountain are in East Brunswick Township, Schuylkill County; **South Lookout** (224), **Cobble** (225), **River of Rocks** (226), **Hemlock Heights** (227), and **Owls Head** (228) are in Albany Township, Berks County. Towering outcrops and joint blocks of the Tuscarora quartzite (Silurian age) are exposed. The **North Lookout** is a massive outcrop of Tuscarora sandstone, 1520 feet above sea level; from this site,



SOUTH LOOKOUT

one may view a truly majestic 70-mile vista of the Great Valley and Blue Mountain. **South Lookout** is 1340 feet above sea level. The **River of Rocks**, a boulder field formed during the Ice Age, is 1 mile long and several hundred feet wide. **Dans Pulpit** is formed from outcrops of the Tuscarora quartzite standing in vertical columns. They are spectacular, and the scenic view to the south across the Great Valley is magnificent. The Appalachian Trail is adjacent to these geologic features. The area has been designated a National Natural Landmark.



DANS PULPIT AND RIVER OF ROCKS FROM SOUTH LOOKOUT

Dans Pulpit **River of Rocks**



Owls Head



Hemlock Heights



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION

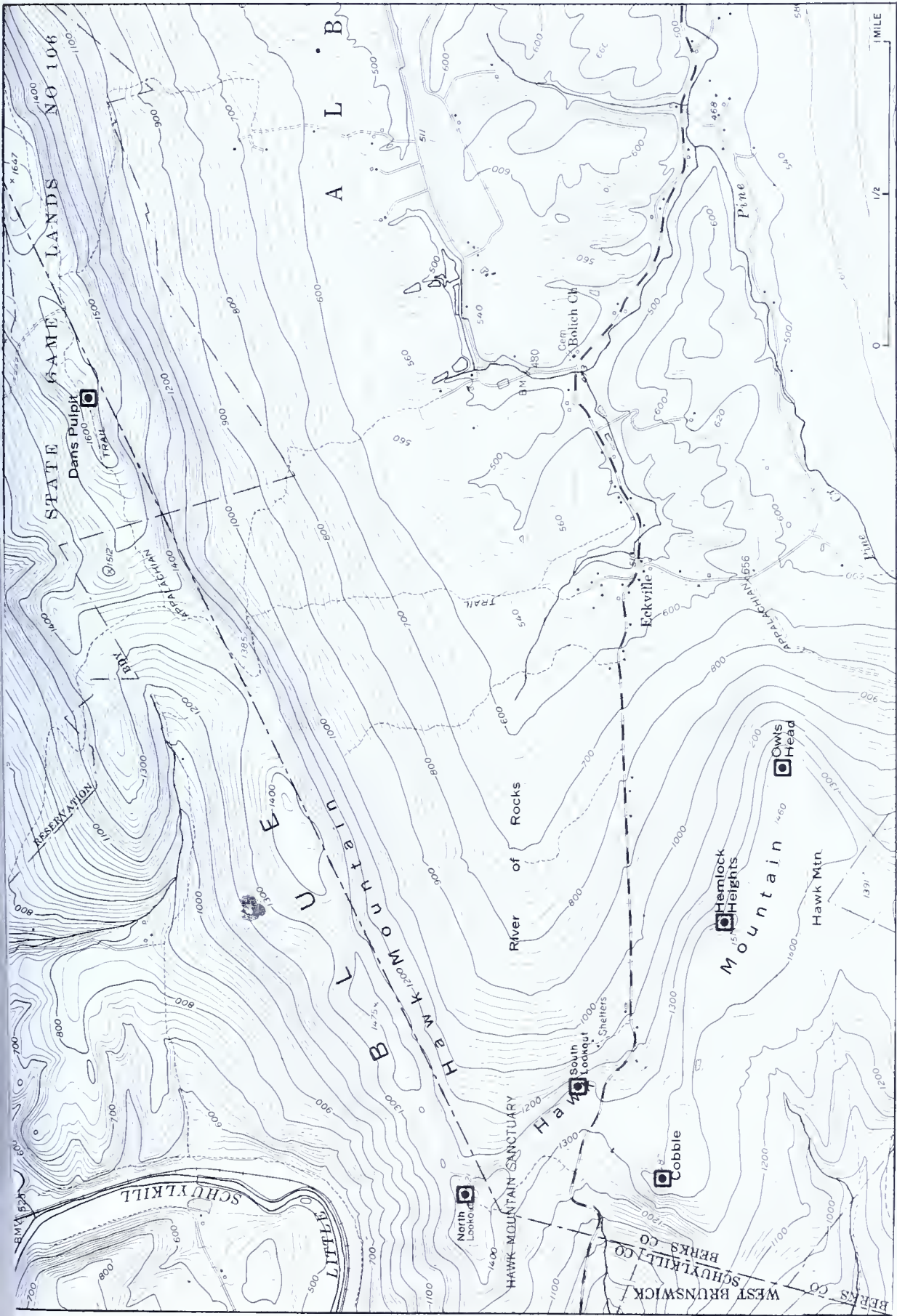


221. HAWK MOUNTAIN LOOKOUTS *(continued)*



NORTH LOOKOUT

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



229. HAWSTONE OVERLOOK

COUNTY: Juniata

TOWNSHIP: Milford

QUADRANGLE: Mifflintown

LOCATION: Overlook on the side of Blue Mountain, east of the village of Hawstone on Pa. Route 333.

REMARKS: An excellent view of the **Lewistown Narrows** (230), created by the Juniata River between Blue Mountain and Shade Mountain, and the Valley and Ridge province in central Pennsylvania.



NOTES:

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



231. HELLS KITCHEN

COUNTY: Luzerne

TOWNSHIP: Butler

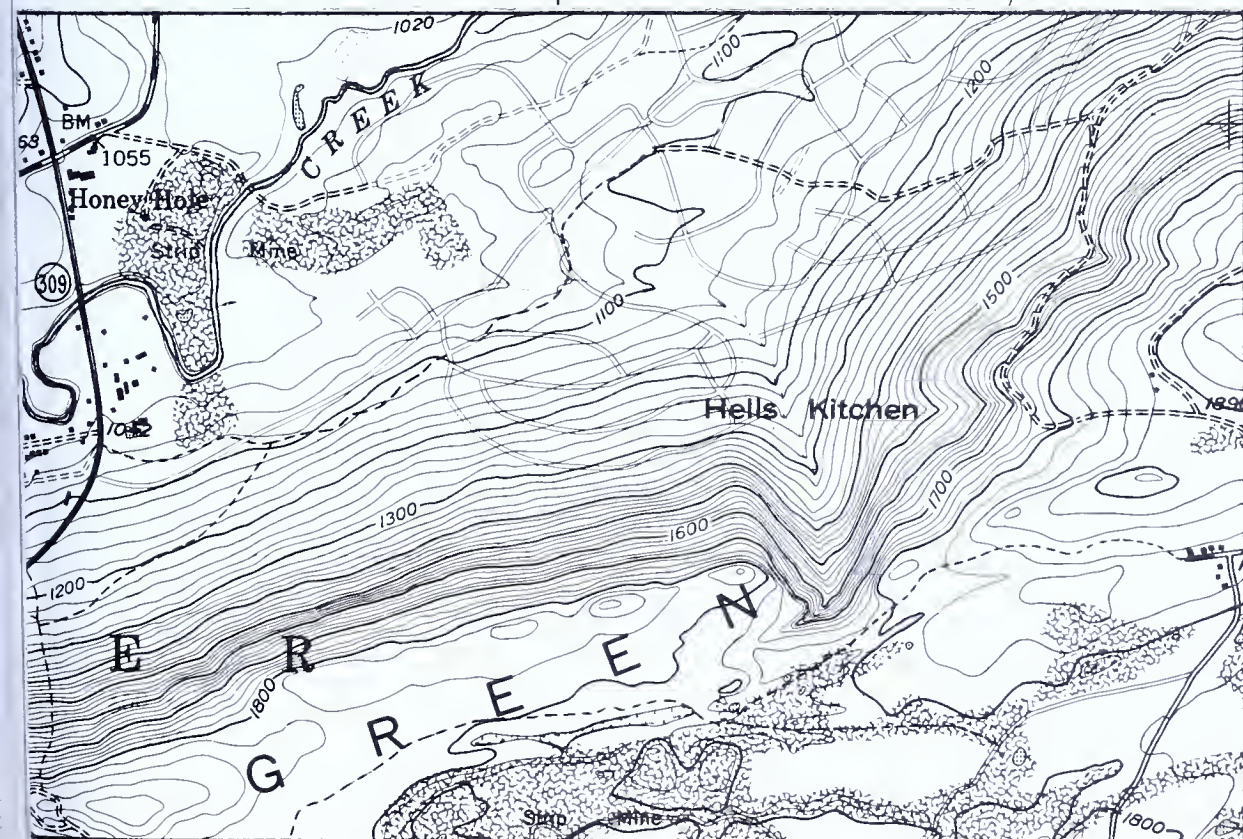
QUADRANGLE: Freeland

LOCATION: On Green Mountain, 2 miles north-west of the Borough of Freeland.



REMARKS:

Headward erosion by a small stream on the north flank of Green Mountain has created a narrow, steep-sided valley on the mountain. The stream is eroding soft shales and siltstones of the Mauch Chunk Formation (Mississippian age) at the base and on the slope. Outcrops of Pottsville conglomerate (Pennsylvanian age) are exposed on the rim of the canyon.



232. HOGBACK

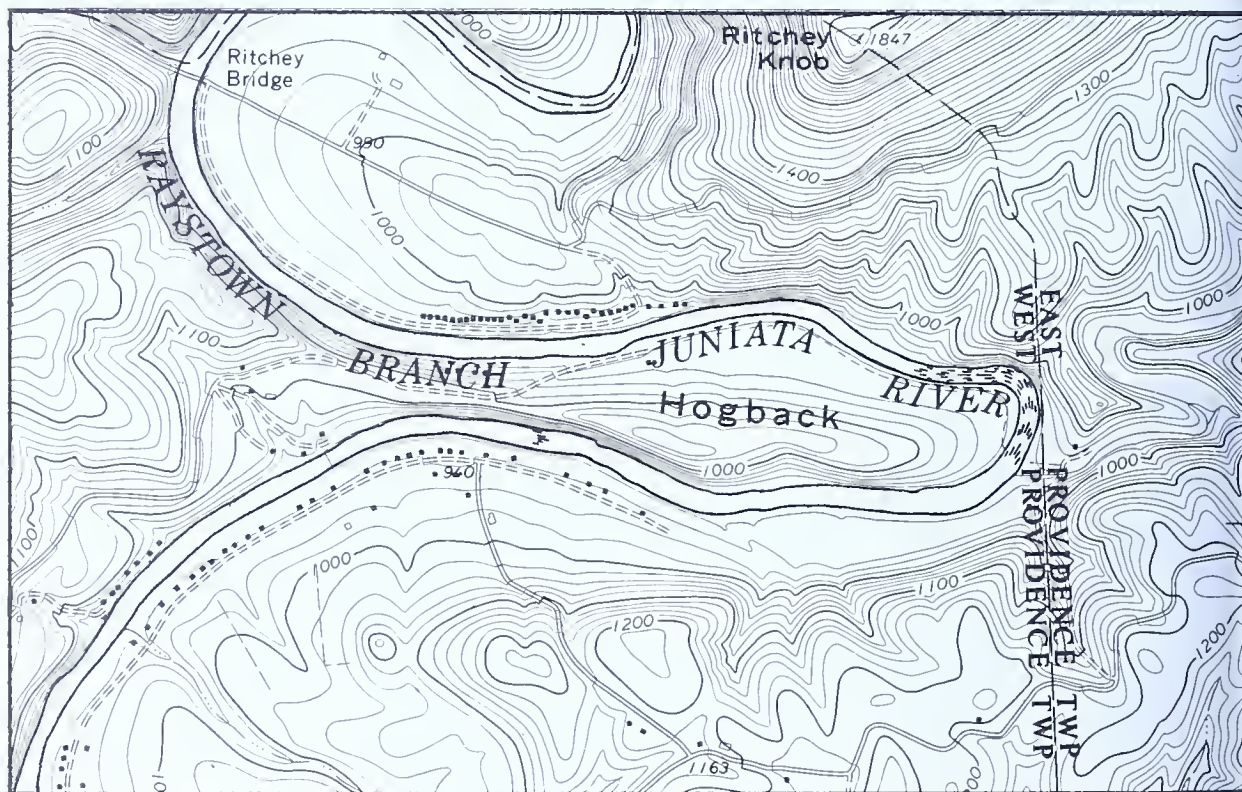
COUNTY: Bedford

TOWNSHIP: West Providence

QUADRANGLE: Everett East

LOCATION: Along the Raystown Branch of the Juniata River; 4 miles northeast of Everett.

REMARKS: A narrow sliver of red shale, siltstone, and sandstone (Catskill Formation, Devonian age) in a tight meander of the Raystown Branch of the Juniata River. These are classic examples of meanders and are the best in the Commonwealth.



NOTES:

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



233. HORSESHOE CURVE

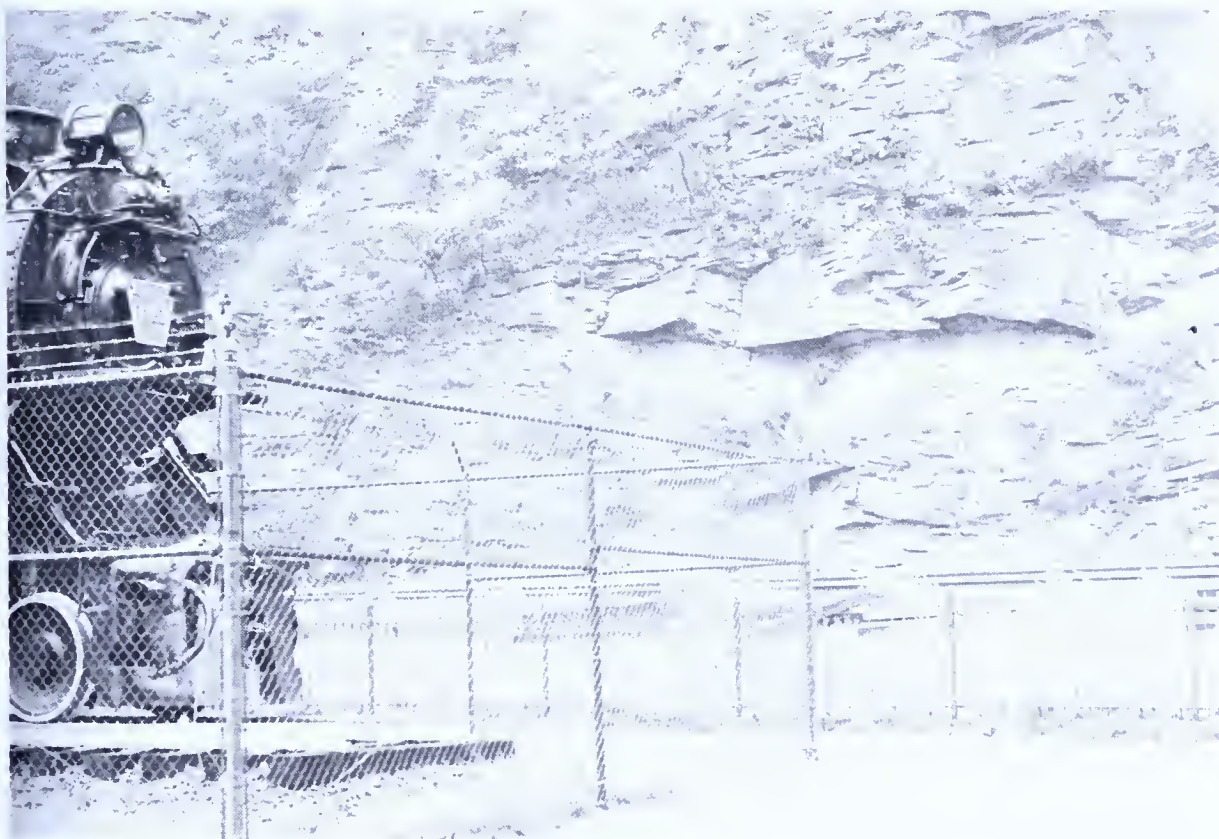
COUNTY: Blair

TOWNSHIP: Logan

QUADRANGLE: Hollidaysburg

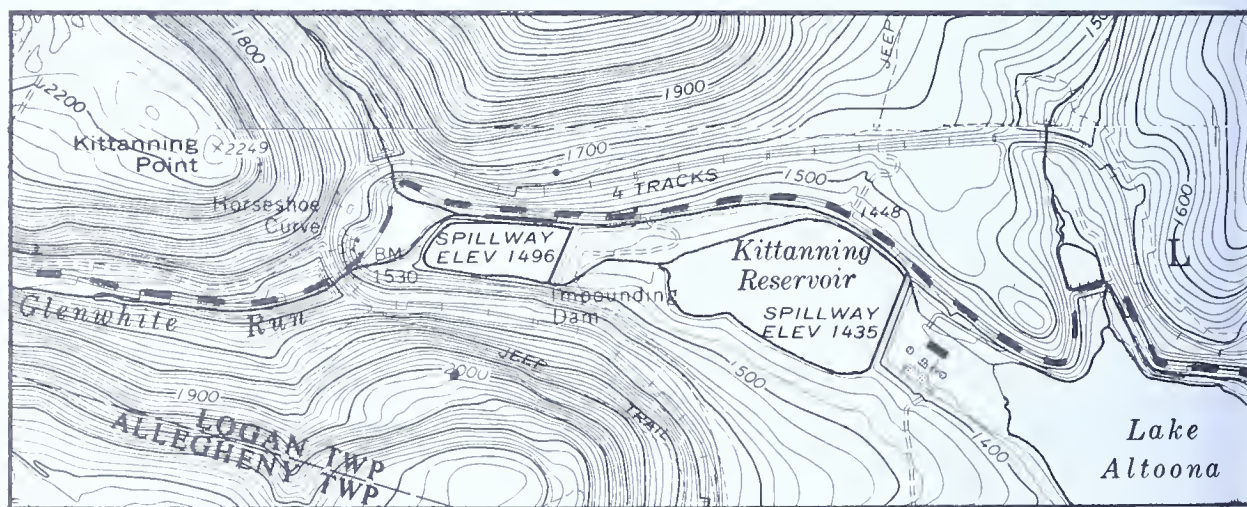
LOCATION: Along the Penn Central Railroad tracks, 5 miles west of Altoona.

REMARKS: This is the finest display of Late Paleozoic rocks to be found along the Allegheny Front; the rock section extends for more than 45,000 feet and exposes some 7000 feet of rock thickness. Mostly shales and sandstones are exposed; they range in geologic age from the base of the Upper Devonian Lock Haven Formation to the base of the Pennsylvanian Conemaugh Group.



233. HORSESHOE CURVE (*continued*)

Engineers had been dreaming for two decades of how to conquer the Alleghenies by rail. In 1847 the Pennsylvania Railroad re-surveyed the route west and decided on the route that exists today. About 5 miles west of Altoona the valley ran abruptly into the Allegheny Front. To go directly across the valley would have meant building a bridge that had a 4.37 percent grade, which was far too steep for practical rail operations. Instead, they sliced off the face of the mountain so the tracks would make a large semicircle; this became the Horseshoe Curve. The Horseshoe Curve is an engineering marvel of 1854. It has won the engineering world's admiration for the ingenuity of its idea, for the skillful design of its details, and for the engineers' courage in undertaking such a large construction task before the day of the bulldozer and the steam shovel. The Horseshoe Curve has become a scenic wonder of the world.



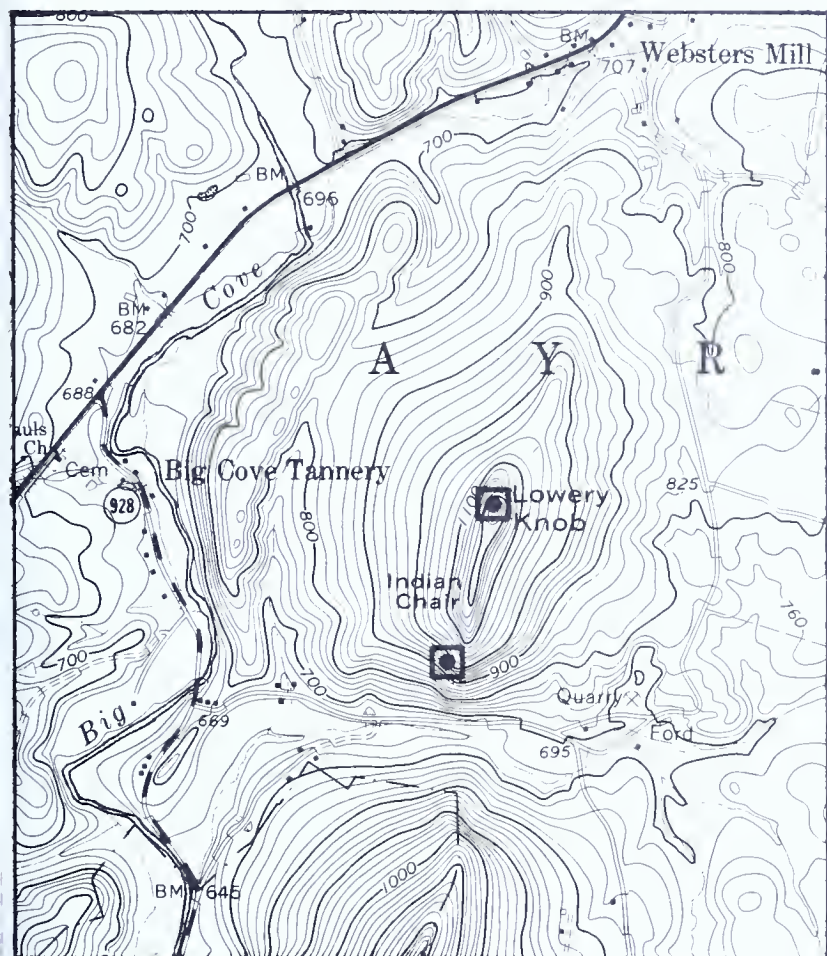
REFERENCE:

Swartz, F. M. (1965), *Guide to the Horseshoe Curve section between Altoona and Gallitzin, central Pennsylvania*, Pennsylvania Geological Survey, 4th ser., General Geology Report 50, 58 p.

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



234. INDIAN CHAIR



COUNTY: Fulton

TOWNSHIP: Ayr

QUADRANGLE: Big
Cove Tannery

LOCATION: Six miles
south of McConnells-
burg on Dickeys
Mountain.

REMARKS: Jagged
outcrops of the Tusca-
rora quartzite (Silurian
age) against the sky-
line produce an out-
line resembling a "gi-
ant chair." **Lowery
Knob** (235) marks the
high point on the
ridge.



236. INDIAN CHAIR

COUNTY: Monroe

TOWNSHIP: Smithfield

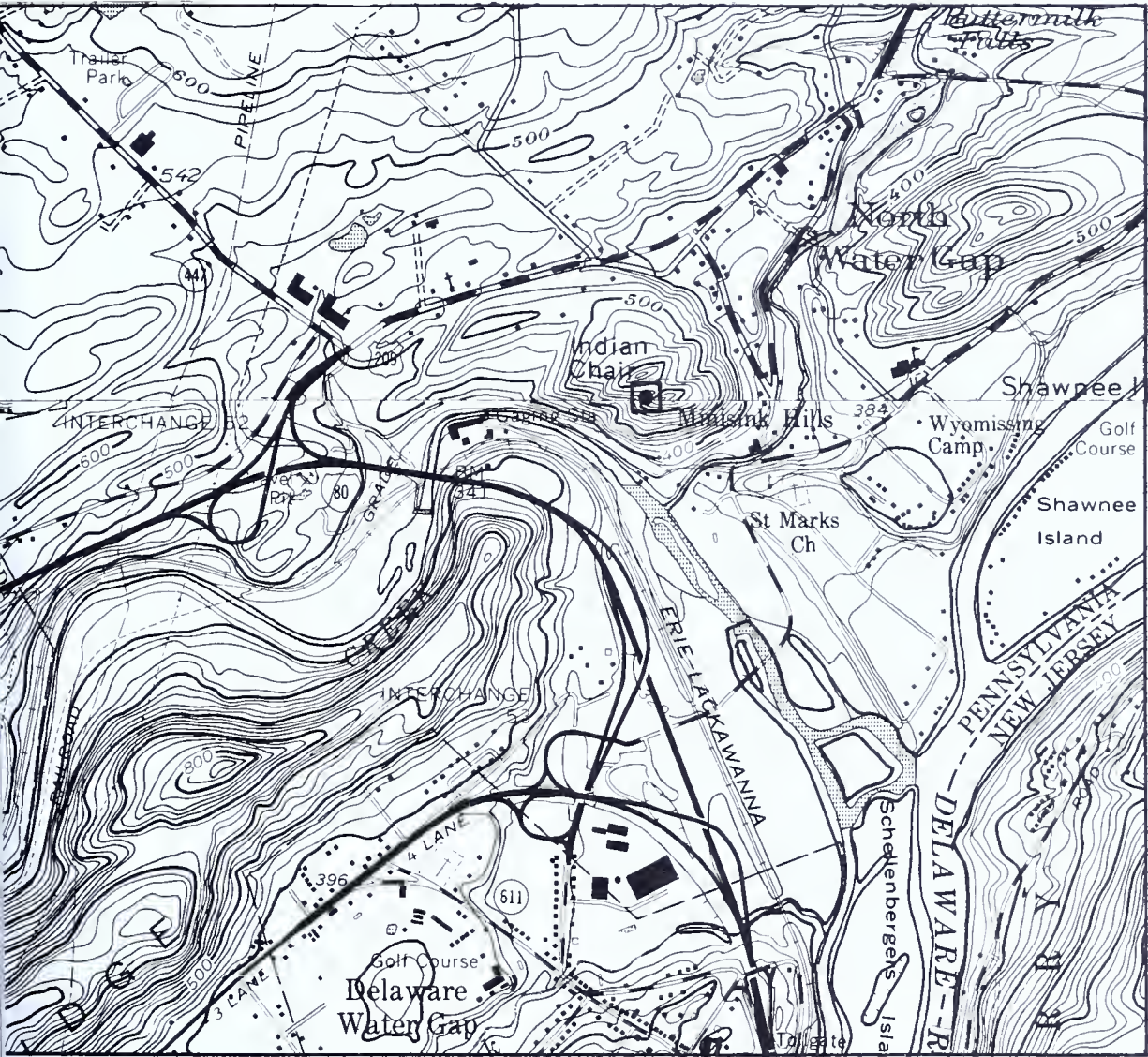
QUADRANGLES: Stroudsburg and East Stroudsburg

LOCATION: Immediately north and east of the village of Minisink Hills; at the southwest corner of the summit near the village.

REMARKS: In addition to the many archaeological discoveries made here, the dark-gray chert (flint) of the Buttermilk Falls Limestone and Shriver Chert (Old Port Formation, Devonian age), which originally attracted the Indians, are important geological units exposed. The high-quality stone was used in making weapons and tools. Nearby is the old Leni Lenape tribe village of Minisink. The outcrop near the crest of the hill resembles a huge chair.



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



NOTES:

237. I-81 SCENIC VIEW

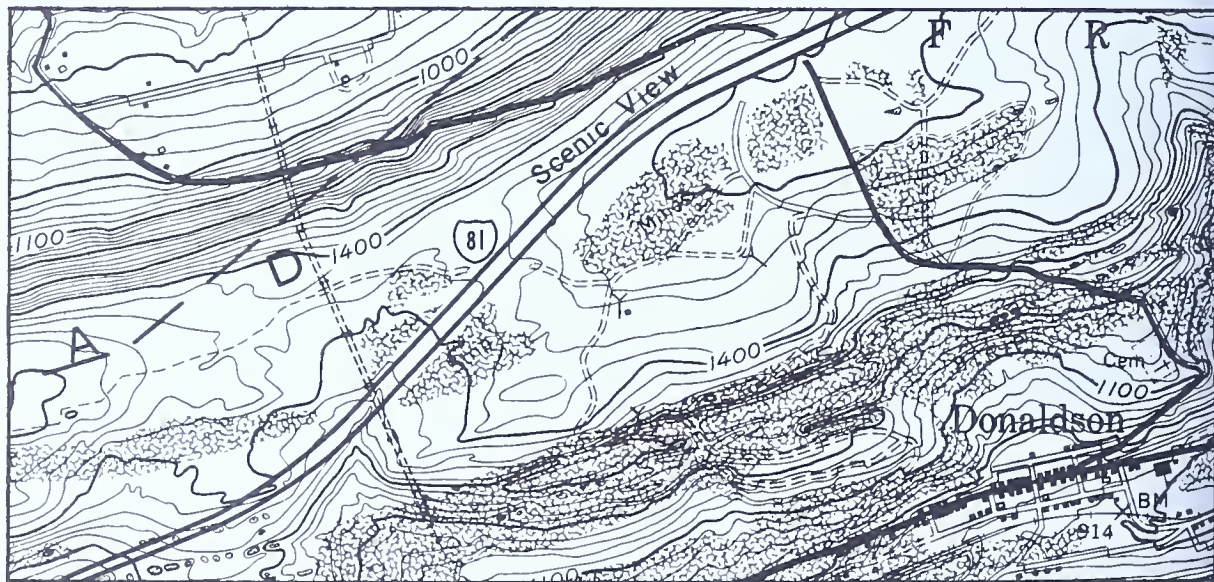
COUNTY: Schuylkill

TOWNSHIP: Frailey

QUADRANGLE: Tremont

LOCATION: Along the southbound lanes of Interstate 81 at mile 109; between exit 33 (Tremont-Tower City) and exit 34 (Hegins); approximately 2 miles northwest of Tremont.

REMARKS: A breathtaking view of Hegins Valley between Broad Mountain (south) and Mahantango Mountain (north); an exceptional example of the Valley and Ridge province in the region of the anthracite basins.





238. JUNIATA RIVER OVERLOOK

COUNTY: Perry

TOWNSHIP: Howe

QUADRANGLE: Duncannon

LOCATION: An overlook along U. S. Routes 322 and 22 about 7 miles north of Amity Hall.

REMARKS: The Juniata River is extremely picturesque at this location as it meanders through a valley of red shales and siltstones of the Catskill Formation (Late Devonian age) and olive-gray siltstones of the Trimmers Rock Formation (Late Devonian age).

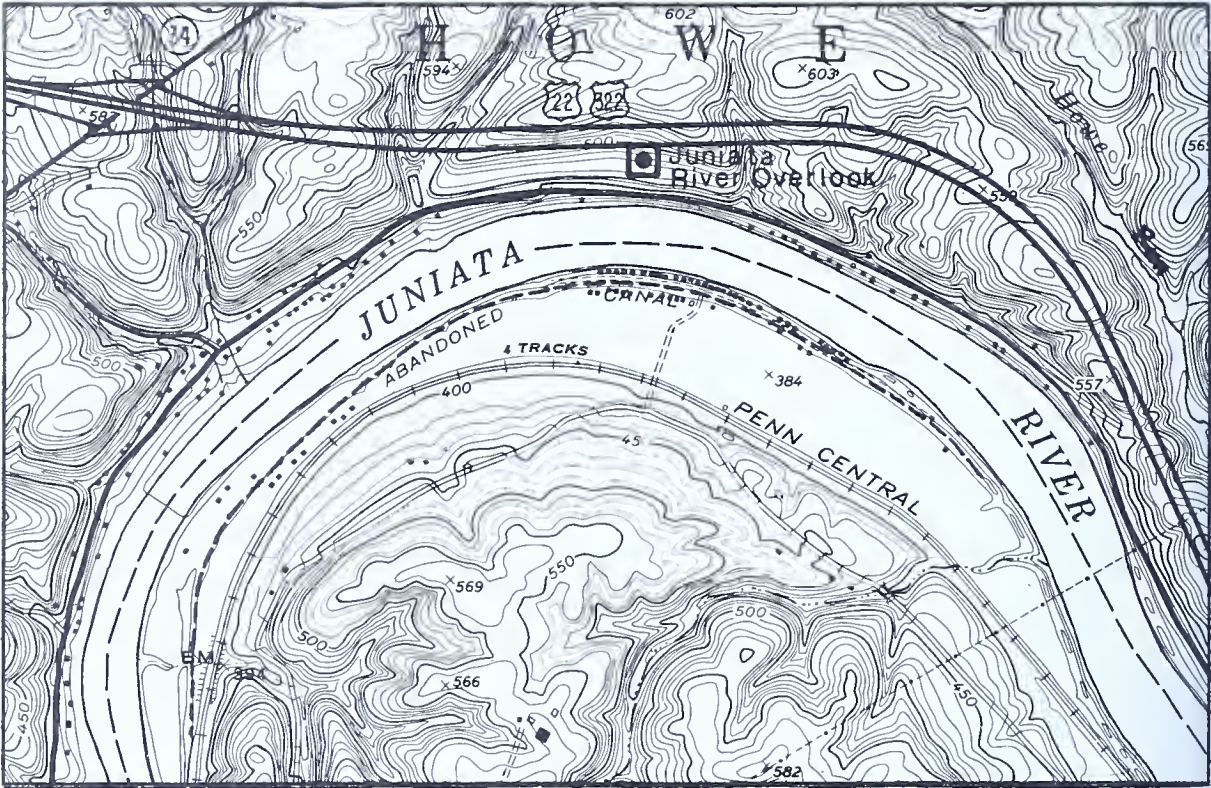
Hickory Ridge to the south is underlain by the Montebello Sandstone Member of the Mahantango Formation (Middle Devonian age), a much more weather resistant rock; hence the high ridge.

A wide floodplain on the south bank of the river, produced by the buildup of sands and gravels on the inner shore of the meander, is a favorite site for summer cottages. Even though repeated floods have destroyed these homes, old and new residents continue to build and rebuild.

REFERENCE: Dyson, J. L. (1963), *Geology and mineral resources of the northern half of the New Bloomfield quadrangle*, Pennsylvania Geological Survey, 4th ser., Atlas 137ab, 63 p.



238. JUNIATA RIVER OVERLOOK (continued)



NOTES:



239. KELLEY SPRING

COUNTY: Centre

TOWNSHIP: Spring

QUADRANGLE: Bellefonte

LOCATION: Cerro Metal Products Company along the Logan Branch of Spring Creek about 0.2 mile south of the Bellefonte corporate boundary.

REMARKS: The tenth largest of the second-magnitude springs (median flow, 5000 to 20,000 gallons per minute) in Pennsylvania, having a median flow of 7000 gallons per minute. This spring, rising from fractures in limestone (Beekmantown Group, Ordovician age), is used as an industrial water source.

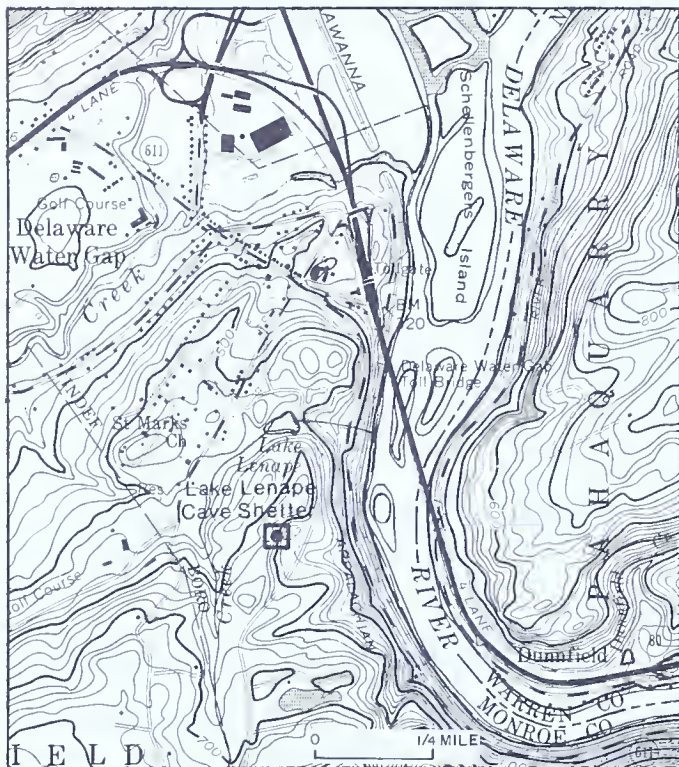


REFERENCE:

Flippo, H. N., Jr. (1974), *Springs of Pennsylvania*, Department of Environmental Resources, Office of Resources Management, Water Resources Bulletin 10, 46 p.



240. LAKE LENAPE CAVE SHELTER



COUNTY: Monroe

BOROUGH: Delaware Water Gap

QUADRANGLE: Stroudsburg

LOCATION: From Pa. Route 611 in Delaware Water Gap, take Township Route 405 west to the dirt road that leads to the Lake Lenape Cave Shelter; the shelter is 300 yards past the lake that is on the right.



REMARKS:

A large overhanging cliff of quartzite of the Shawangunk Formation (Tammany Member, Silurian age) was once used as living quarters by the Leni Lenape Indians. This site has recently been excavated for artifacts left behind by the Indians. Excavation sites such as this supply much of the evidence used to piece together ancient Indian cultures.

VALLEY AND RIDGE PROVINCE

APPALACHIAN MOUNTAIN SECTION



241. LEHIGH GAP

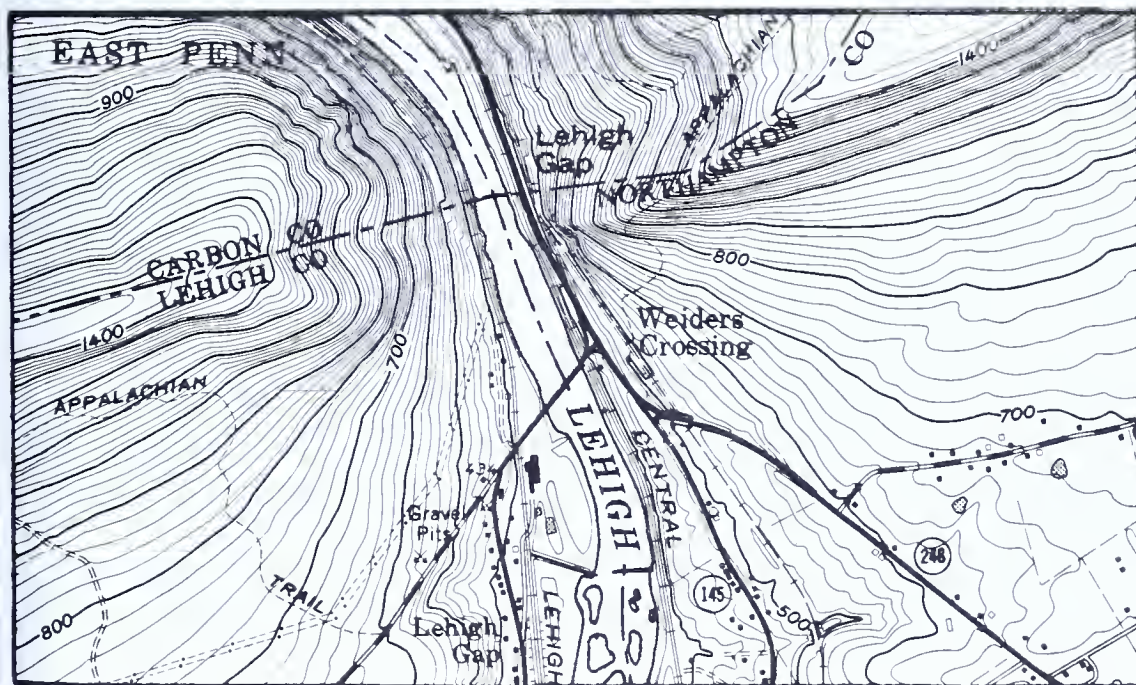
COUNTIES: Lehigh,
Northampton,
and Carbon

TOWNSHIPS: East Penn and Lower
Towamensing (Car-
bon County); Le-
high (Northampton
County); Washing-
ton (Lehigh County)

QUADRANGLE: Palmerton

LOCATION: A gap in Blue Mountain approximately 1 mile south of the Borough of Palmerton.

REMARKS: A magnificent water gap in Blue Mountain. Erosion by the Lehigh River over millions of years brought the gap to its present elevation. A nearly continuous rock sequence from the top of the Martinsburg Formation (Ordovician age) to the Middle Silurian can be seen along the east bank of the river; it is the "type section" of the Lizard Creek Member of the Shawangunk Formation (Lower Silurian).



241. LEHIGH GAP *(continued)*





242. LEHIGH GORGE

<p>COUNTIES: Luzerne and Carbon</p>	<p>TOWNSHIPS: Foster (Luzerne County); Kid- der, Lehigh, and Penn Forest (Carbon County)</p>
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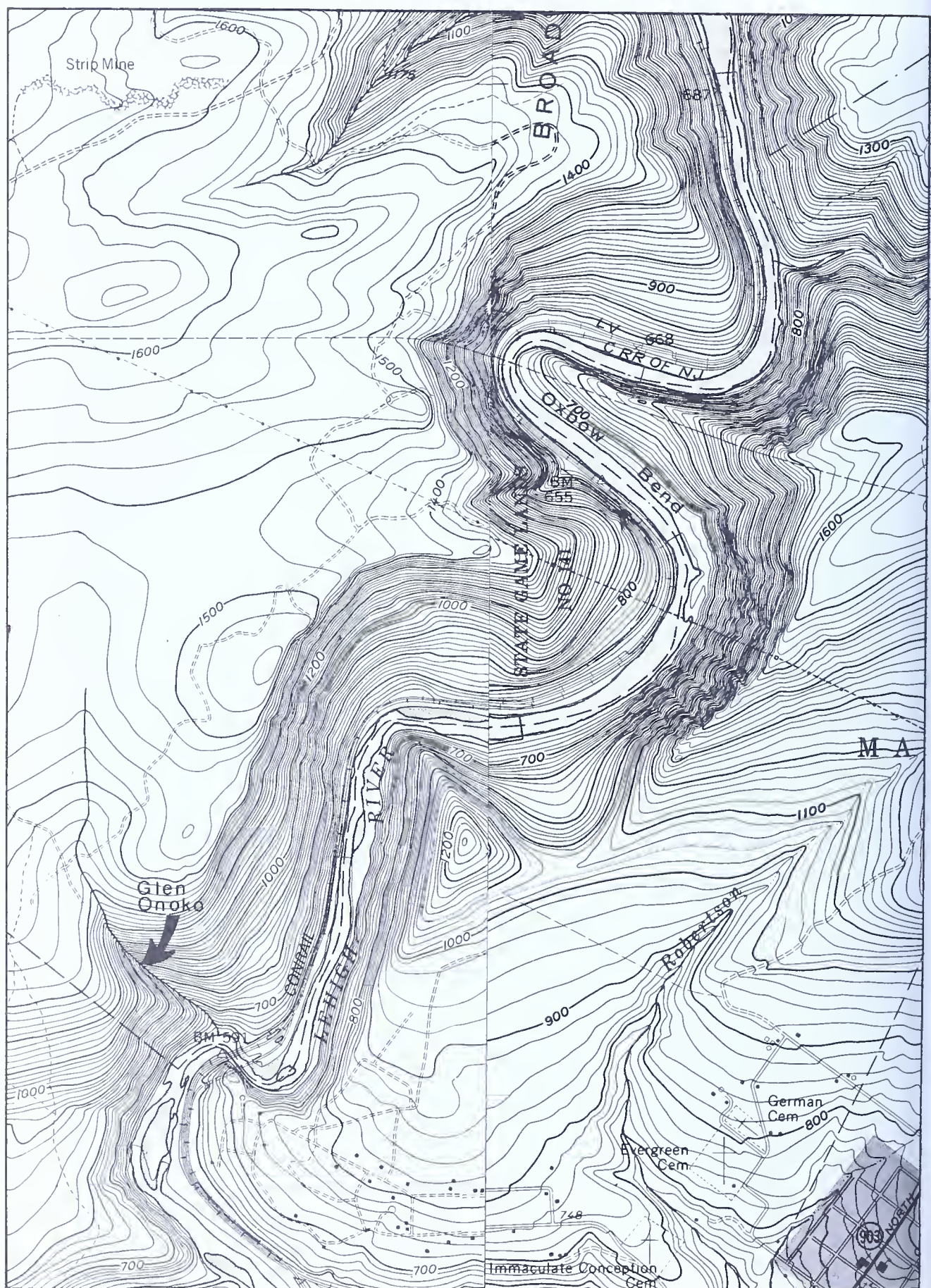
QUADRANGLES: Hickory Run, White Haven, Christmans, Weatherly, Lehighton, and Nesquehoning.

LOCATION: The Lehigh River between White Haven and Jim Thorpe.

REMARKS: One of the prime natural areas of eastern Pennsylvania; it is wild and remote. The gorge is extremely rugged and has a very precipitous east wall near Jim Thorpe; **Glen Onoko** (243) is a steep-walled canyon of uncut timber and spectacular waterfalls.



242. LEHIGH GORGE (continued)



0.6 MI. TO LEHIGHTON

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



- REFERENCES:
- Epstein, J. B., Sevon, W. D., and Glaeser, J. D. (1974), *Geology and mineral resources of the Lehigh and Palmerton quadrangles, Carbon and Northampton Counties, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Atlas 195cd, 460 p.
- Pennsylvania Geology (1969), *Lehigh River Gorge State Park*, v. 1, no. 2, p. 11.
- Sevon, W. D. (1975), *Geology and mineral resources of the Hickory Run and Blakeslee quadrangles, Carbon and Monroe Counties, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Atlas 194cd.

NOTES:

244. MAMMOTH SPRING

COUNTY: Mifflin

TOWNSHIP: Armagh

QUADRANGLE: Burnham

LOCATION: In the Kishacoquillas Valley about 1.8 miles southeast of the village of Milroy; at the head of Honey Creek and the source of the creek.

REMARKS: The third largest spring in Pennsylvania, having a median flow of 14,000 gallons per minute. The spring issues from a hole in a limestone cliff (Benner and Loysburg Formations, Ordovician age). From the spring, the water rushes through a short, beautiful, primitive gorge for the first several hundred yards of Honey Creek.

Beneath the hill and in back of the hole in the cliff is a large limestone wet cave. This



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



cavern was discovered by early settlers in the region but it was not until 1926 that two boys discovered the dry cave about 400 yards upstream from the hole in the cliff and at a right angle to the wet cave. Both the dry and the wet caverns were open to the public during 1929 under the name of Alexander Caverns. An artificial opening to the dry part of the cave was driven through solid limestone to about 65 feet below the surface. A flight of 115 concrete steps was constructed. Around a turn at the foot of these stairs, a room called The Cathedral contained delicate pencils and films, giant stalactites and ribbons hanging from the ceiling, and large domes, stumps, and columns rising from the floor. It is about 300 yards from the foot of the stairs through the dry cavern. Rooms named The Cathedral, Garden of the Gods, and Chamber of Statues are encountered in this part of the cave system. Where the dry cavern meets the wet cavern, a dock was constructed and visitors were taken by boat for nearly a quarter of a mile to daylight at Mammoth Spring. The wet part of the cave makes several nearly right angled turns, developed along vertical joint planes in almost horizontal beds of limestone. Delicate cave formations, stalactites, and ribbons of dripstone hang down over the water. The greater width of the wet cavern, ranging from 40 to 100 feet, and the much greater height, up to 65 feet above the water, together with the fact that this part of the cave is only accessible by water, make this section extremely attractive. The temperature in the cave is reported to be 52 degrees.

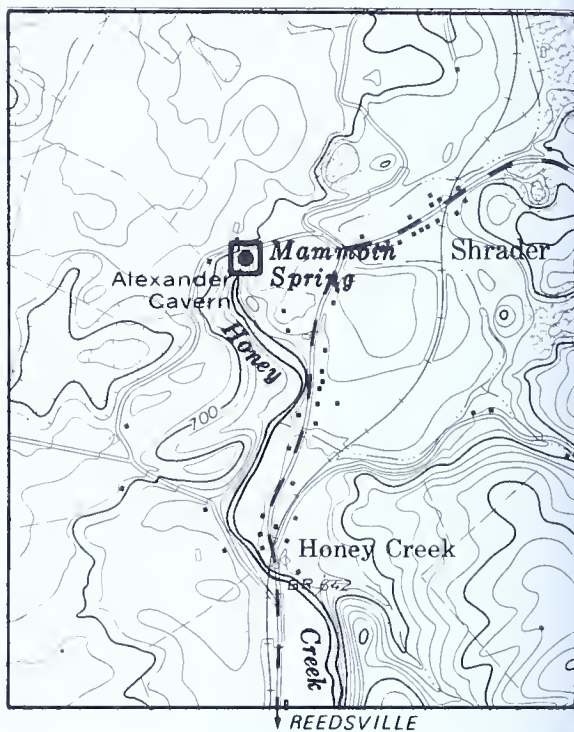
Today, Alexander Caverns is not a commercial cave. Its present owners have sealed the stairs to the cave and the water entrance to the caverns is forbidden

244. MAMMOTH SPRING (continued)

REFERENCES: Flippo, H. N., Jr. (1974), *Springs in Pennsylvania*, Department of Environmental Resources, Office of Resources Management, Water Resources Bulletin 10, 46 p.

Stone, R. W., Barnsley, E. R., Hickok, W. O., 4th, and Mohr, C. E., *Pennsylvania caves*, 2nd ed., rev., Pennsylvania Geological Survey, 4th ser., General Geology Report 3, 143 p.

NOTES:



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



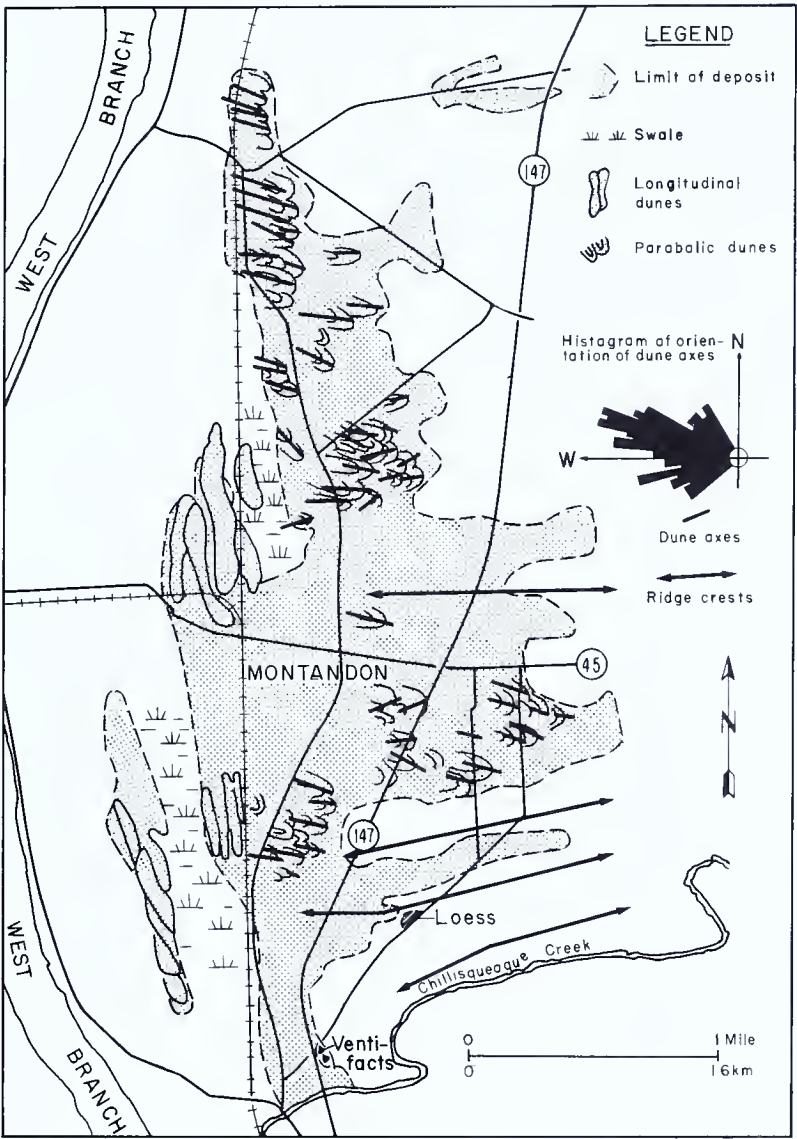
245. MONTANDON SAND DUNES

COUNTY: Northumberland

TOWNSHIP: West Chillis-
squake

QUADRANGLE: Northumberland

LOCATION: Along the east bank of the West Branch of the
Susquehanna River, opposite Lewisburg.



OUTSTANDING SCENIC GEOLOGICAL FEATURES OF PENNSYLVANIA

REMARKS:

A sand-dune field created during the Wisconsin Age, the latest of several periods of glaciation that covered parts of Pennsylvania. Although the Wisconsin glacier stopped several miles north of the river, large amounts of sediment were carried into the river and deposited on floodplains downstream. The floodplain here is very broad, and the terraces are well developed; wind, sweeping across the lower terraces, picked up silt and sand and deposited them on the upper terraces to the east. At this site the sand has been blown out into parabolic dunes in a dune field that extends about 1.5 miles east of the river. These dunes are U-shaped, and their tails point up wind. This sequence of dunes, created from glacial outwash, is a rare phenomenon of the Wisconsin Age in Pennsylvania and is not very common in the United States.

REFERENCE:

Chase, C. M. (1977), *Central Pennsylvania sand dunes*, *Pennsylvania Geology*, v. 8, no. 3, p. 9-12.

NOTES:

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



246. NANCYS SADDLE

COUNTY: Franklin

TOWNSHIP: Hamilton

QUADRANGLE: St. Thomas

LOCATION: Within Buchanan State Forest; 4.8 miles north of the village of St. Thomas; on Front Mountain.

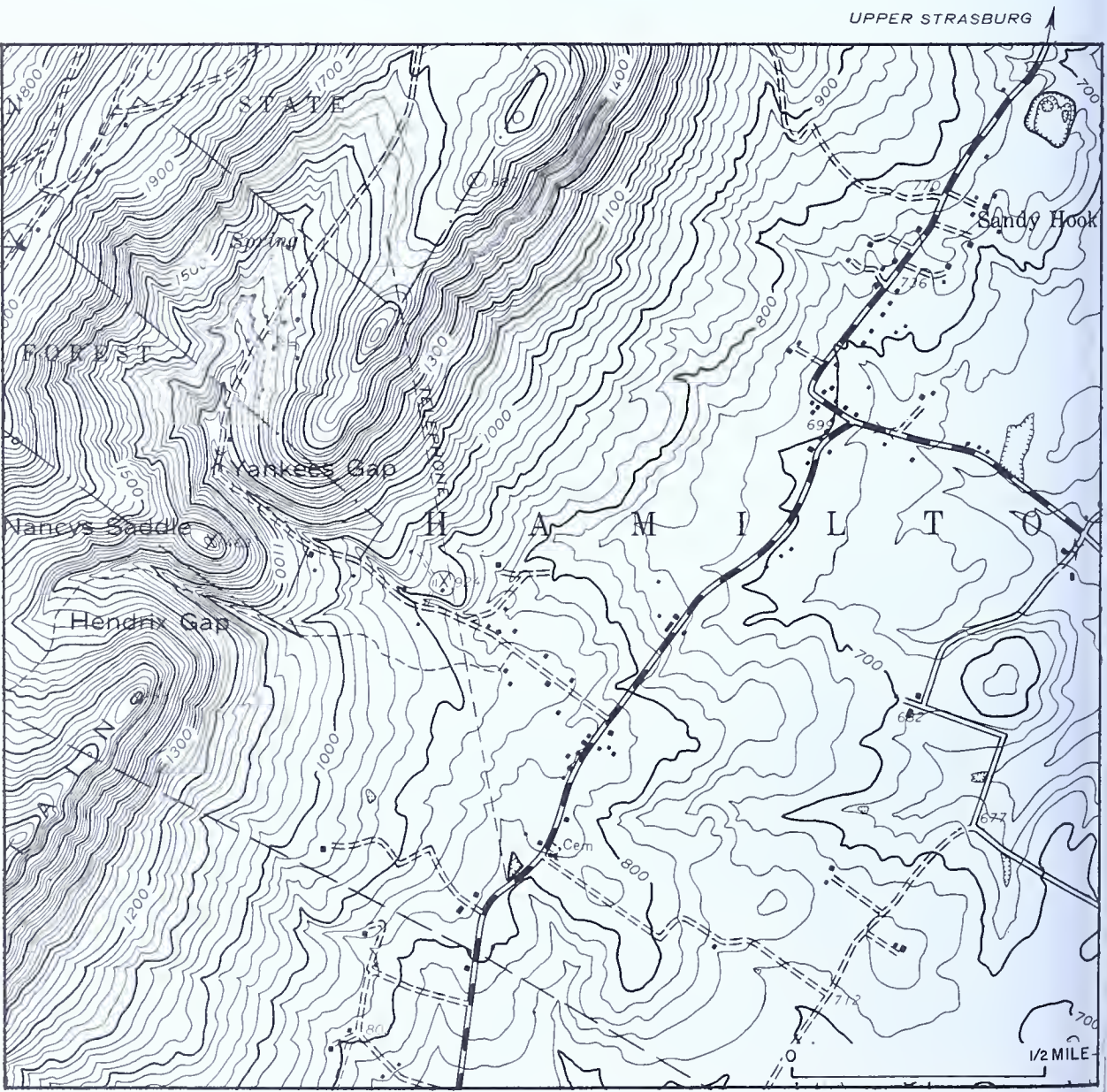
REMARKS: Erosion by two streams through Front Mountain has produced a broad, flat gap sloping gently on both sides and resembling a saddle in shape. Local folklore says it resembles a young lady lying on her back with her legs outstretched; hence the name, Nancys Saddle.

Both **Parnell Knob** (247), 5.5 miles to the southwest on Front Mountain in St. Thomas Township, and Nancys Saddle are erosional features sculptured from the hard, dense Tuscarora quartzite (Silurian age).

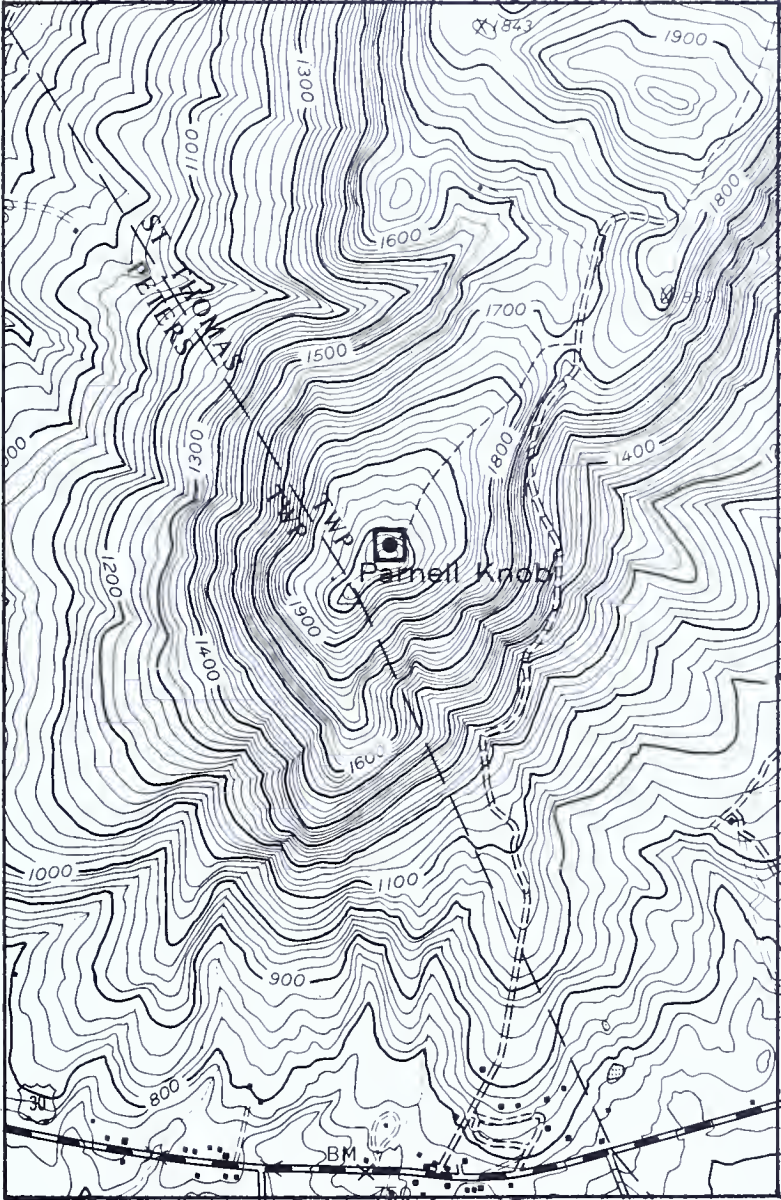
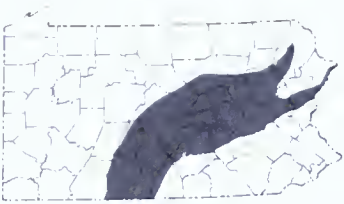


246. NANCYS SADDLE *(continued)*

During the Civil War, Nancys Saddle provided a passageway from the Cumberland Valley to a large intermountain valley to the west. Yankee soldiers used this passageway to the mountain valley to hide their stock of horses. Later, the valley became known as Horse Valley.



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



PARNELL KNOB

248. NAY AUG PARK GORGE

COUNTY: Lackawanna

CITY: Scranton

QUADRANGLE: Scranton

LOCATION: City of Scranton; approximately one-half mile west of exit 52 on Interstate 81; within the city park.

REMARKS: A magnificent gorge and waterfalls on Roaring Brook, which passes through Nay Aug Park. Dark-gray to black shales and siltstones of the Llewellyn Formation (Pennsylvanian age) are exposed in the walls of the 75-foot-deep gorge. The park is also the site of the Brooks mine, the only model coal mine in Pennsylvania.



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



249. NIPPONO SPRING (ENCHANTED SPRING)

COUNTY: Lycoming

TOWNSHIP: Limestone

QUADRANGLE: Linden

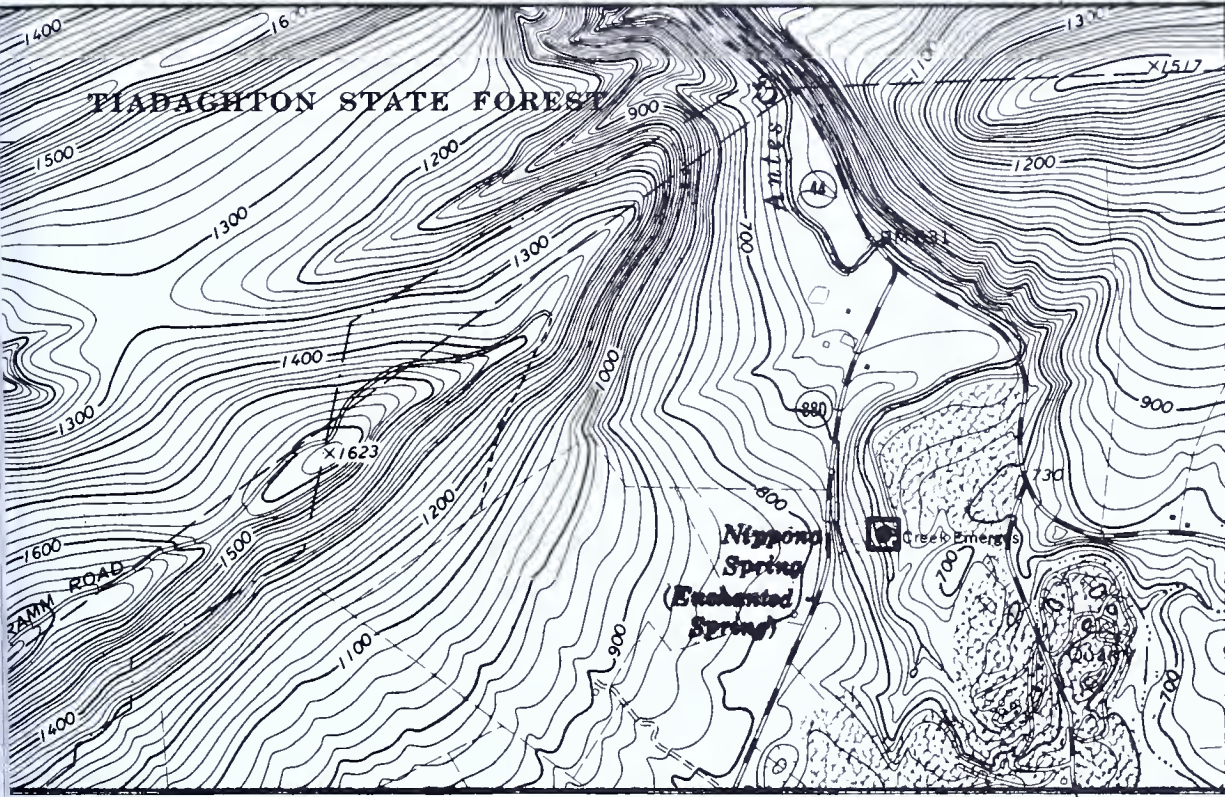
LOCATION: In the Nippenose Valley about 1.2 miles north of the village of Oriole and 600 feet east of Pa. Route 880; near the head of Antes Creek.

REMARKS: The largest of Pennsylvania's second-magnitude springs (median flow, 5000 to 20,000 gallons per minute), having a median flow of 18,000 gallons per minute; Pennsylvania has none in the first-magnitude category. The spring originates from fractures in limestones of the Nealmont and Benner Formations (Ordovician age) in a secluded, beautiful hemlock grove.

REFERENCE: Flippo, H. N., Jr. (1974), *Springs of Pennsylvania*, Department of Environmental Resources, Office of Resources Management, Water Resources Bulletin 10, 46 p.



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



ORIOLE

NOTES:

250. NITTANY MOUNTAIN OVERLOOK

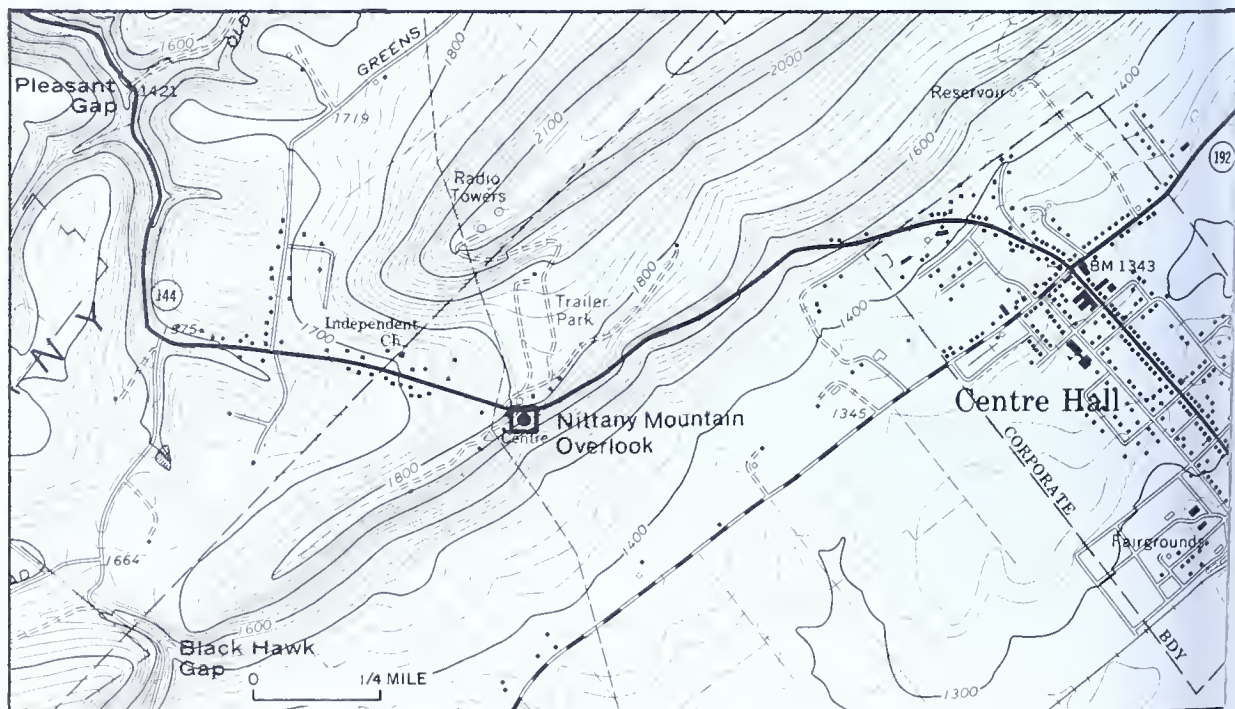
COUNTY: Centre

TOWNSHIP: Potter

QUADRANGLE: Centre Hall

LOCATION: Approximately 1.2 miles east of the Borough of Centre Hall; along Pa. Route 144 on the crest of Nittany Mountain.

REMARKS: A magnificent view of Penns Valley and the Seven Mountains area to the south.



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



251. PENNS VIEW

COUNTY: Centre

TOWNSHIPS: Penn and Haines

QUADRANGLE: Coburn

LOCATION: South of Coburn; included in Bald Eagle State Forest.

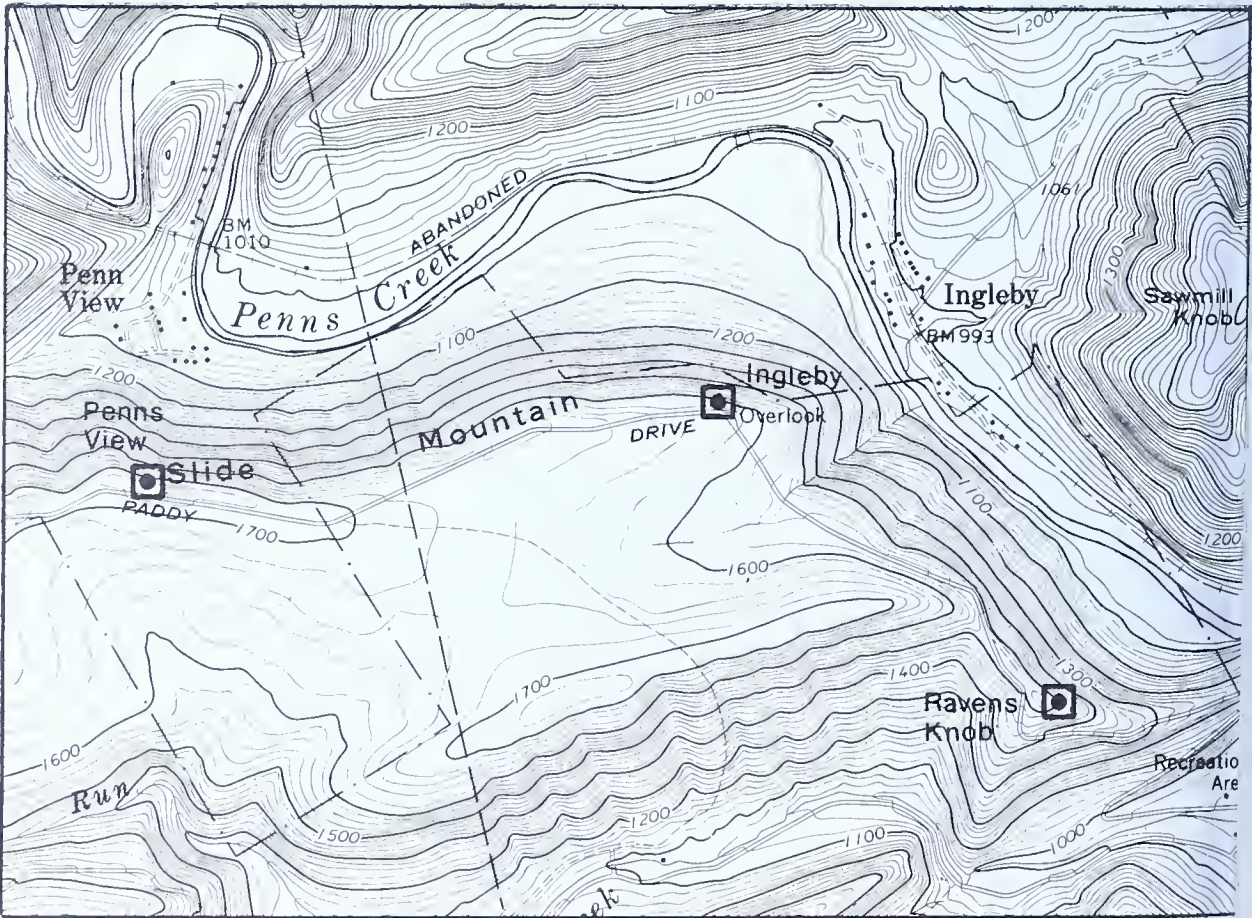
REMARKS: Penns Creek has cut a deep, twisting (meandering) channel through a series of high ridges and valleys. This is probably the most scenic and lengthy series of water gaps in the Valley and Ridge province. **Penns View** along Poe Paddy Drive is recognized as one of the finest scenic overlooks in the United States. Outcrops of red conglomerate of the Bald Eagle Formation (Ordovician age) are exposed on the rim of the overlook. **Ingleby** (252) and **Ravens Knob** (253) overlooks are located nearby.



PENNS VIEW

251. PENNS VIEW (continued)

RAVENS KNOB



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



INGLEBY

254. PETERS MOUNTAIN OVERLOOK

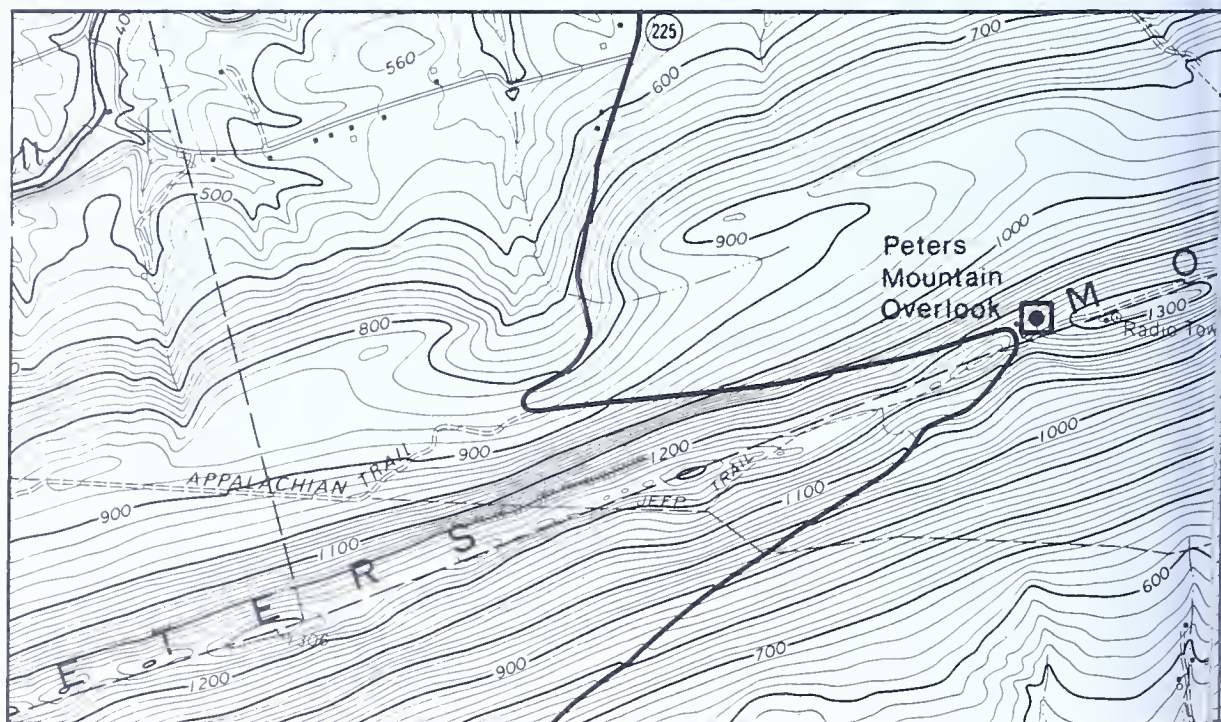
COUNTY: Dauphin

TOWNSHIP: Halifax

QUADRANGLE: Halifax

LOCATION: Atop Peters Mountain at the intersection of Pa. Route 225 and the Appalachian Trail.

REMARKS: An exceptional view (north) of the Valley and Ridge province; encompasses Powells Valley, Berry Mountain, Mahantango Mountain, and the meandering Susquehanna River.



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



255. PINCHOT FALLS (SAWKILL FALLS)

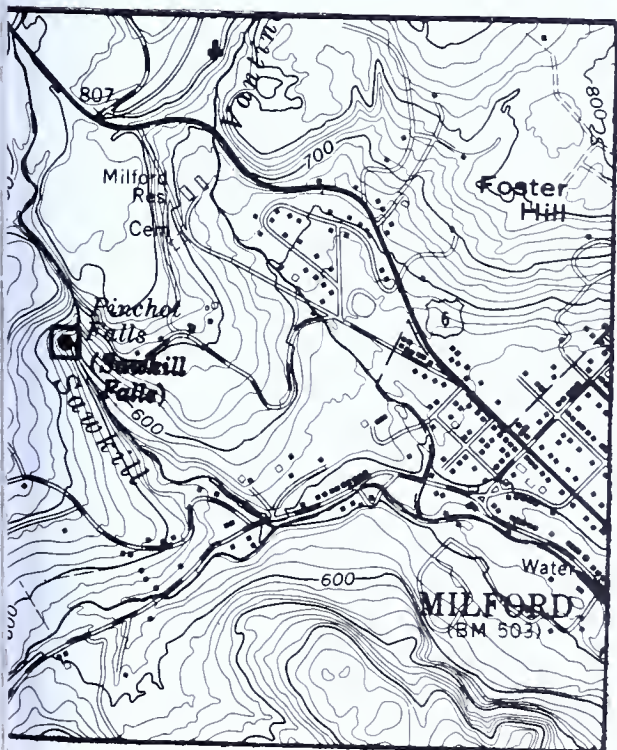
COUNTY: Pike

TOWNSHIP: Dingman

QUADRANGLE: Milford

LOCATION: The falls are located on the private property of the Pinchot Estate and are open to the public by permission of the Pinchot family.

REMARKS: Pinchot Falls on Sawkill Creek is a spectacular flow of water cascading more than one hundred feet through a narrow gorge cut into the Mahantango Formation (Devonian age). It is one of the most spectacular of the falls between Matamoras and Bushkill. Pinchot Gray Towers, the homesite of Gifford Pinchot (former governor of Pennsylvania) is maintained by the Forest Service, U. S. Department of Agriculture, and is open to the public from 8:00 a.m. until 4:00 p.m.



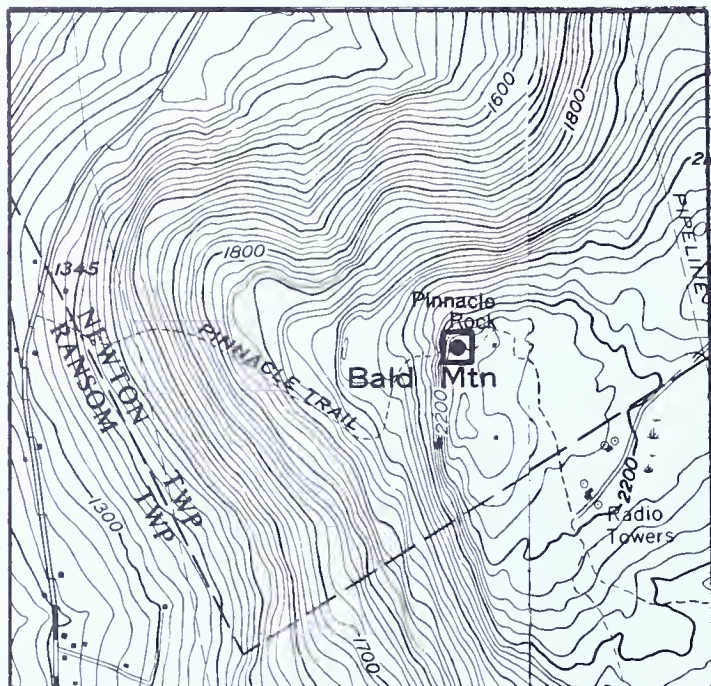
256. PINNACLE ROCK

COUNTY: Lackawanna

TOWNSHIP: Newton

QUADRANGLE: Ransom

LOCATION: Approximately 6 miles northwest of the City of Scranton; on Bald Mountain.



REMARKS: An outcrop of Catskill conglomerate (Devonian age) forms a prominent outcrop; a first-order triangulation station marker is located in the rock. From "Pinnacle Rock" the northernmost extension of this province can be seen. Mountain ridges common to this section are less distinct here, and the topography tends to blend with that of the Glaciated Low Plateaus section of the Appalachian Plateaus province.



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



257. PRAYER ROCK

COUNTY: Mifflin

TOWNSHIPS: Menno and Oliver

QUADRANGLE: Allensville

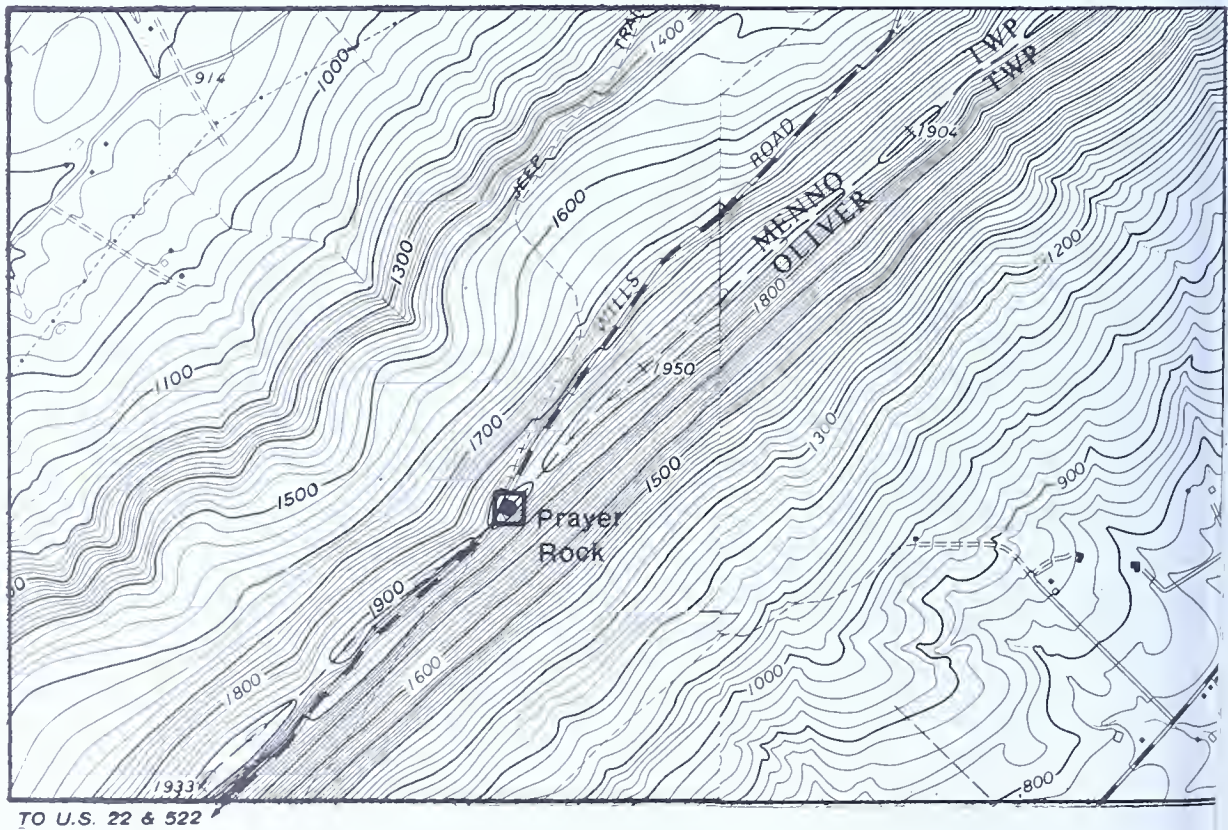
LOCATION: At the crest of Jacks Mountain on Wills Road (LR 44033) between Belleville and McVeytown.

REMARKS: A magnificent overlook; view to the northwest and southeast across the mountains. Massive outcrops of steeply dipping Tuscarora quartzite (Silurian age) form the ridge crest. The Mifflin County Federation of Men's Bible Classes erected a monument to God at this site.



NOTES:

257. **PRAYER ROCK** *(continued)*



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



258. PULPIT ROCK

COUNTY: Berks

TOWNSHIP: Albany

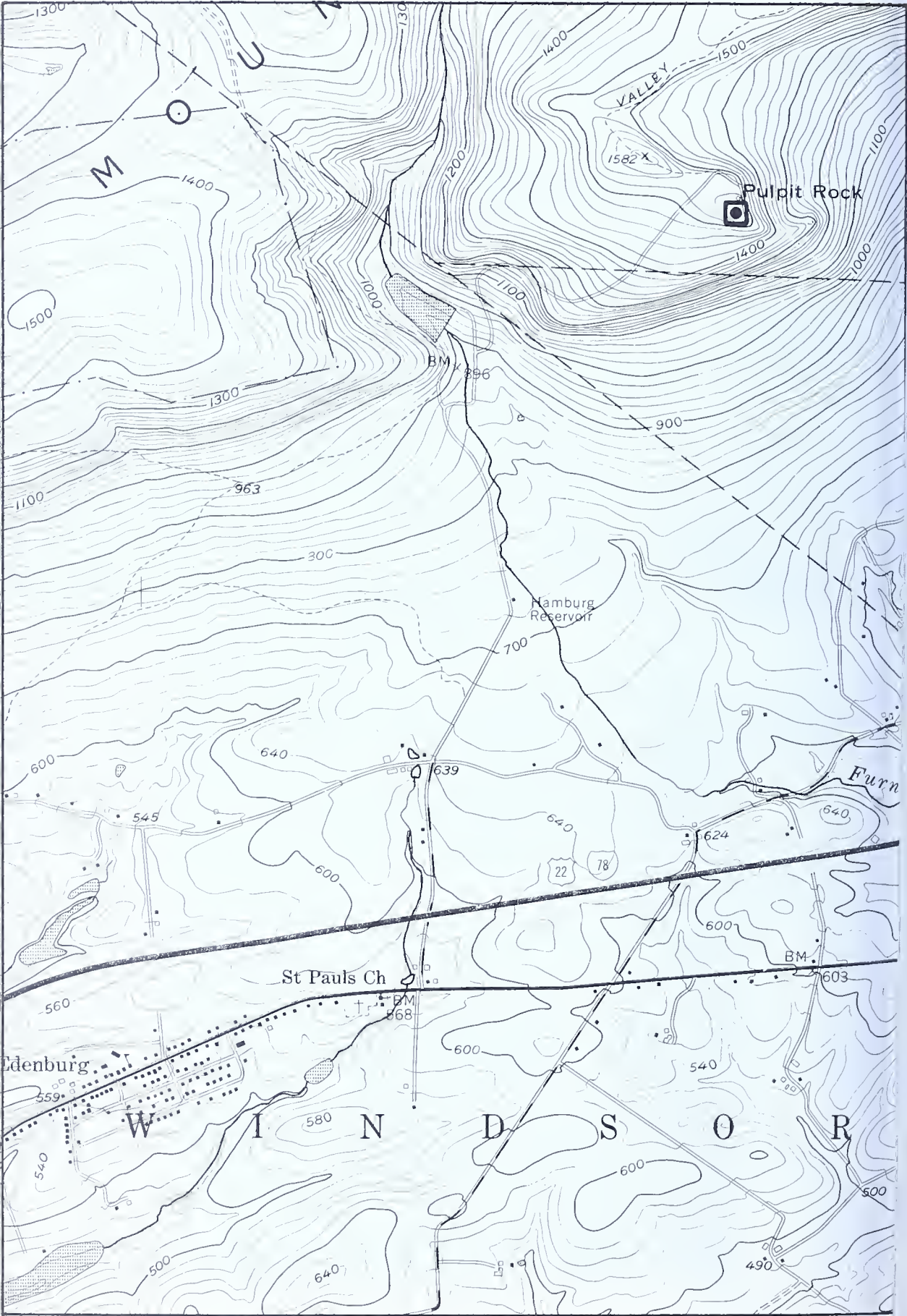
QUADRANGLE: Hamburg

LOCATION: Two and nine-tenths miles northwest of Lenhartsville, on Blue Mountain; approximately 0.9 mile northwest of Blue Rocks Block Field.

REMARKS: Erosion of a sharp fold (bend) in the Tuscarora quartzite (Silurian age) of Blue Mountain has produced a rock feature resembling a "pulpit."



258. PULPIT ROCK (continued)



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



259. PULPIT ROCKS

COUNTY: Huntingdon

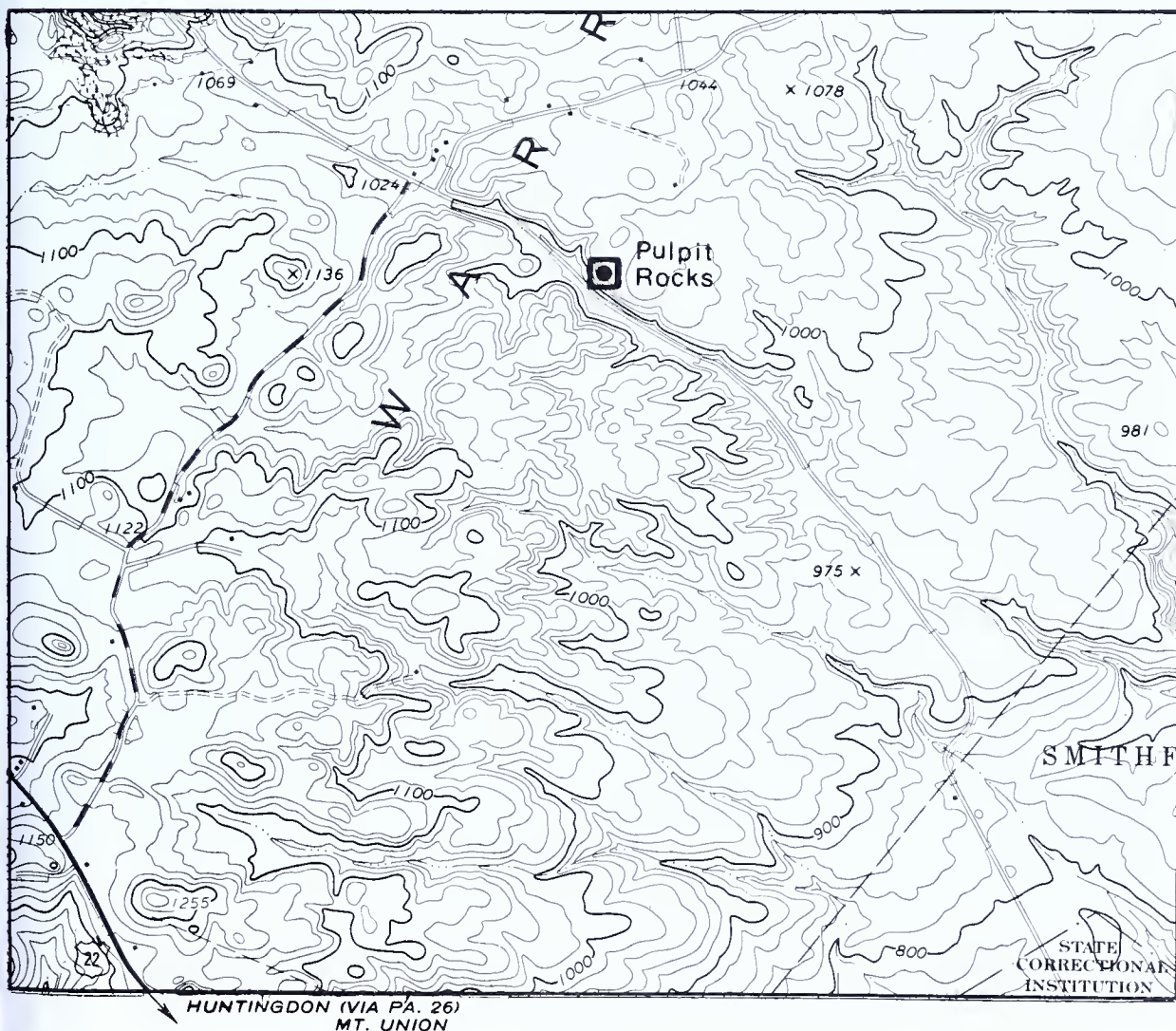
TOWNSHIP: Porter

QUADRANGLE: Alexandria

LOCATION: Northwest of Huntingdon on Warrior Ridge along an unimproved road between Alexandria and the State Correctional Institution.

REMARKS: The Ridgeley Sandstone Member (Old Port Formation, Devonian age) has been eroded to produce isolated pillars.

REFERENCE: White, I. C. (1885), *The geology of Huntingdon County, Pennsylvania Geological Survey*, 2nd ser., Report of Progress T3, p. 215-216.



259. PULPIT ROCKS *(continued)*



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



216 T?

PLATEXXXIX

Pulpit rocks of Oriskany Sandstone,

FIG. 1.

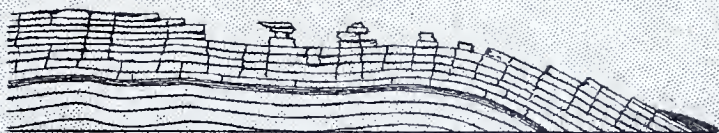


FIG. 2.

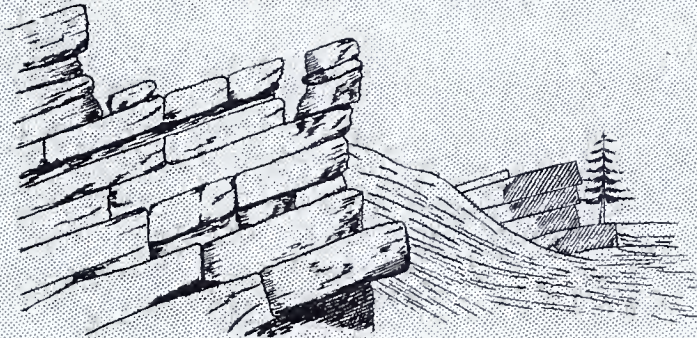


FIG. 3.



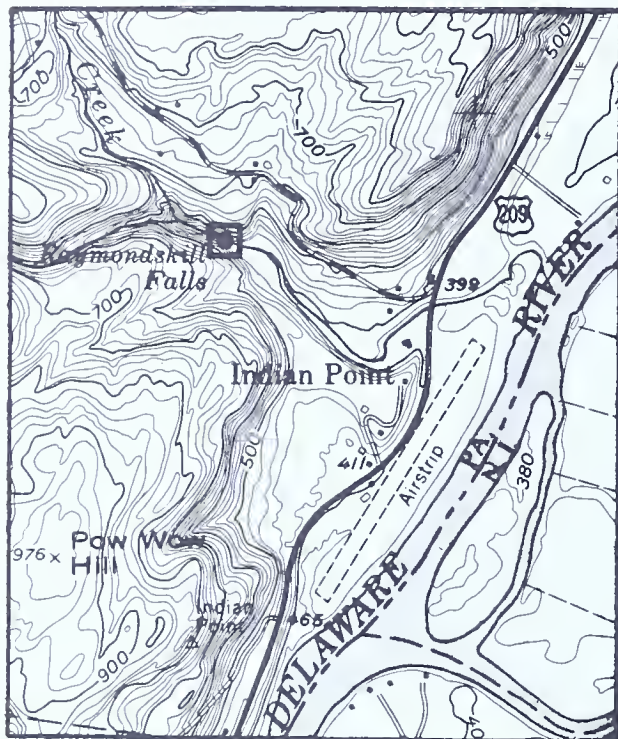
FIG. 4.



73.

(From reference cited above, p 216)

260. RAYMONDSKILL FALLS



COUNTY: Pike

TOWNSHIP: Dingman

QUADRANGLE: Milford

LOCATION: Midway between Milford and Dingmans Ferry; 1/2 mile north-east of U. S. Route 209 at Indian Point; within the Delaware Water Gap National Recreation Area.

REMARKS: The falls are 175 feet high, spectacular, and second only in height to Dingmans Falls.



FROM THE TOP OF THE FALLS
LOOKING DOWN

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



261. RESICA FALLS

COUNTY: Monroe

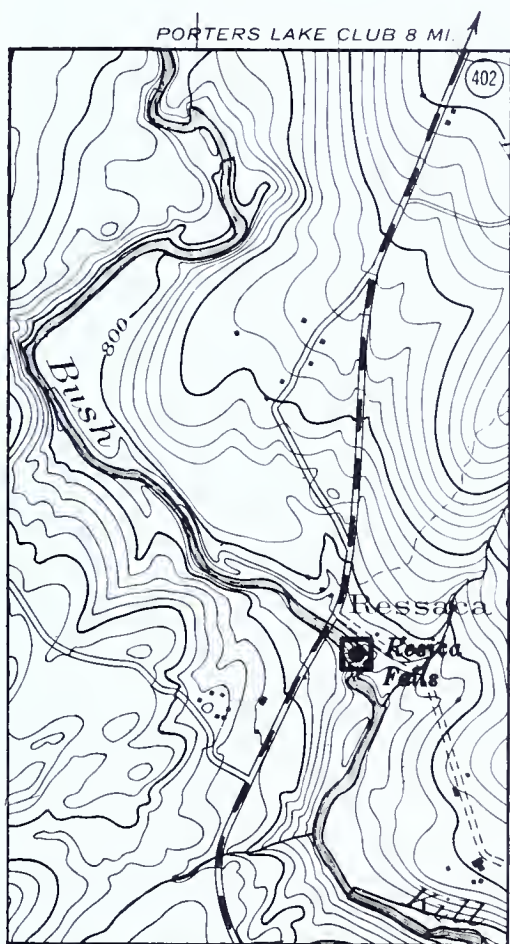
TOWNSHIP: Middle
Smithfield

QUADRANGLE: Bushkill

LOCATION: At the intersection
of Pa. Route 402 and Bush Kill
(creek); 5 miles east of the village
of Bushkill and U. S. Route 209.

REMARKS: Bush Kill cascades
over green and red sandstones
and sandy shales of the Catskill
Formation (Shohola Member, De-
vonian age); very scenic.

REFERENCE: Alvord, D. C., and
Drake, A. A., Jr. (1971), *Geologic
map of the Bushkill quadrangle,
Pennsylvania-New Jersey*, U. S.
Geological Survey Geologic
Quadrangle Map GQ-908.



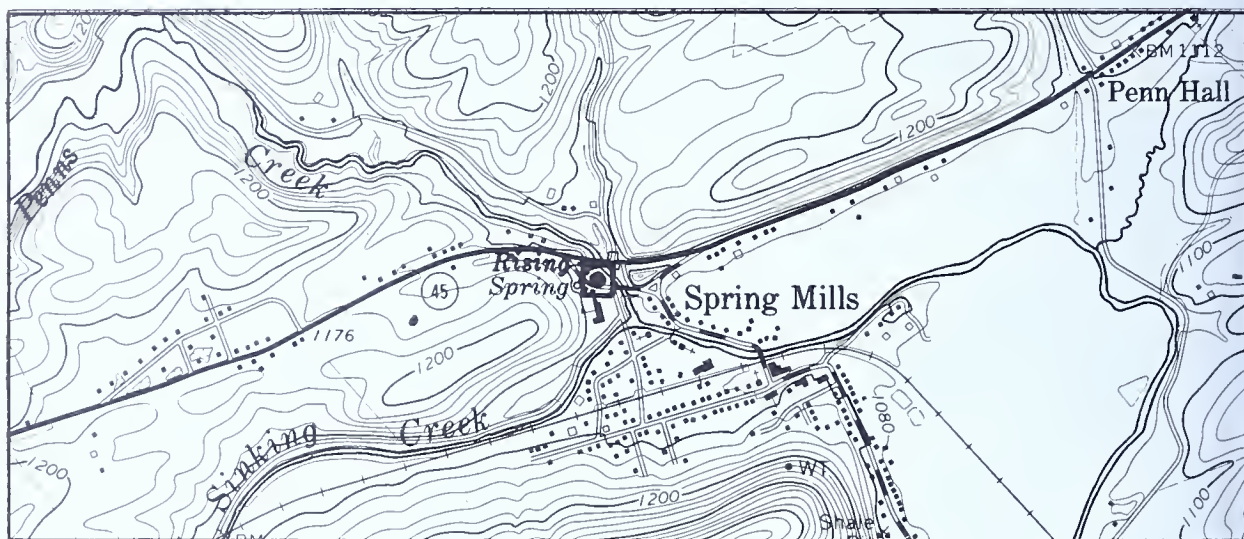
262. RISING SPRING

COUNTY: Centre

TOWNSHIP: Gregg

QUADRANGLE: Spring Mills

LOCATION: Along Penns Creek in the village of Spring Mills.



REMARKS: The eleventh largest of the second-magnitude springs (median flow, 5000 to 20,000 gallons per minute) in Pennsylvania, having a median flow of 6000 gallons per minute. The spring rises from fractures in the Nealmont Limestone (Ordovician age).

REFERENCE: Flippo, H. N., Jr. (1974), *Springs of Pennsylvania*, Department of Environmental Resources, Office of Resources Management, Water Resources Bulletin 10, 46 p.

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



NOTES:

263. ROARING SPRING

COUNTY: Blair

BOROUGH: Roaring Spring

QUADRANGLE: Roaring Spring

LOCATION: Borough of Roaring Spring; southwest corner.

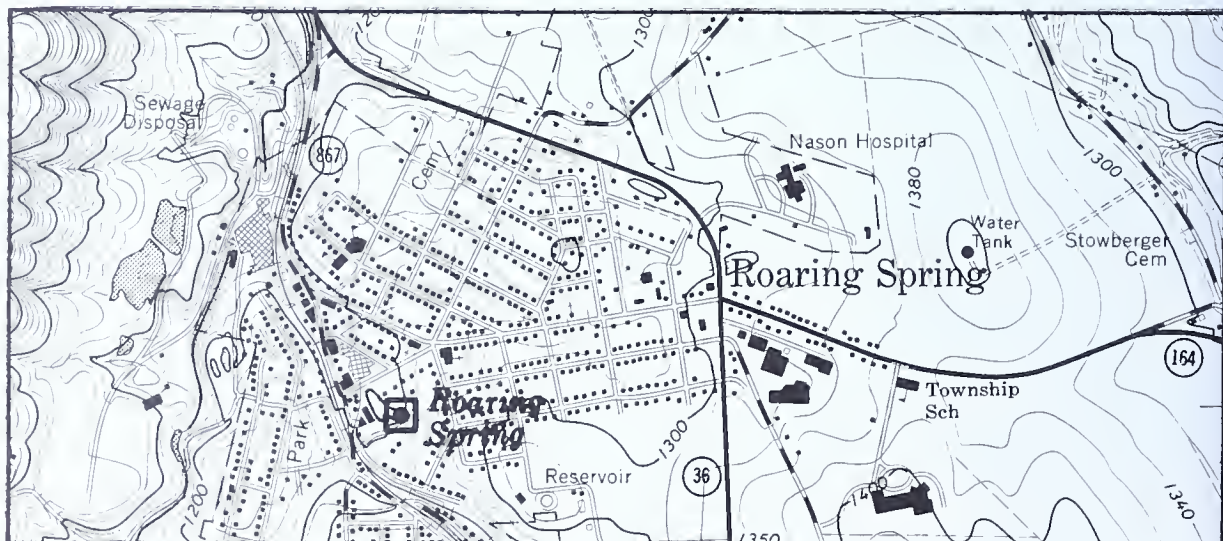


REMARKS:

Blair County's version of Old Faithful; the aquifer is the Nittany Formation (Ordovician age). Discharge as measured in November 1971 was 4280 gallons per minute; the spring is used as a public water supply.

REFERENCE:

Flippo, H. N., Jr. (1974), *Springs of Pennsylvania*, Department of Environmental Resources, Office of Resources Management, Water Resources Bulletin 10, 46 p.



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



264. ST. CLAIR FERN FOSSIL LOCALITY

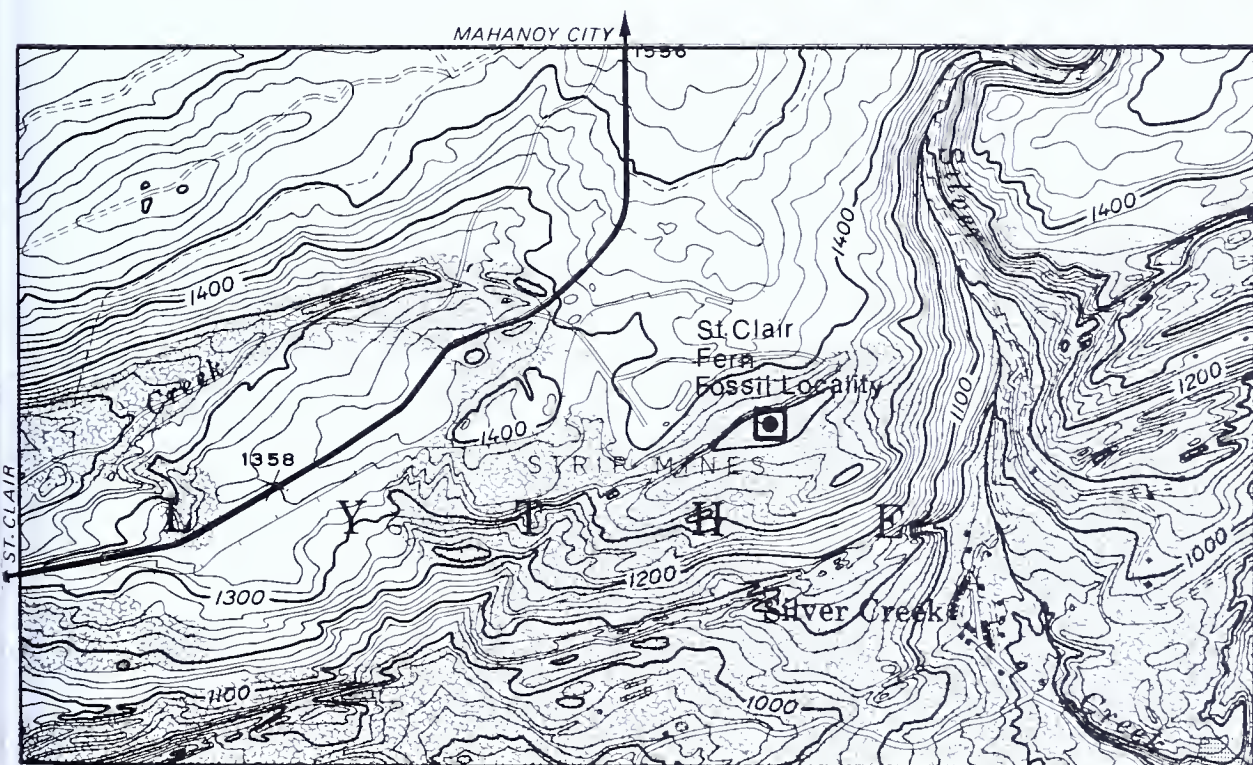
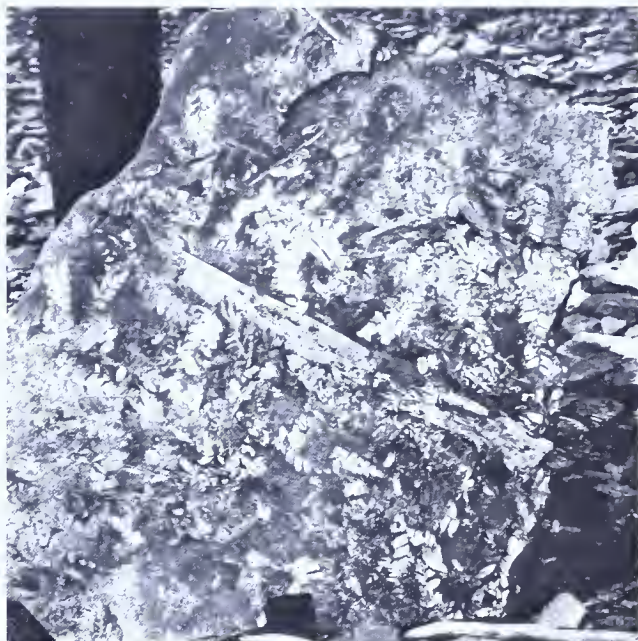
COUNTY: Schuylkill

TOWNSHIP: Blythe

QUADRANGLE: Pottsville

LOCATION: Two and two-tenths miles east of the Borough of St. Clair; in a strip pit of the Reading Anthracite Company. PRIVATE PROPERTY, NO ADMITTANCE.

REMARKS: Chalk-white fern impressions on jet-black shale; a world-renowned site for the variety of fern fossils present and their beauty.



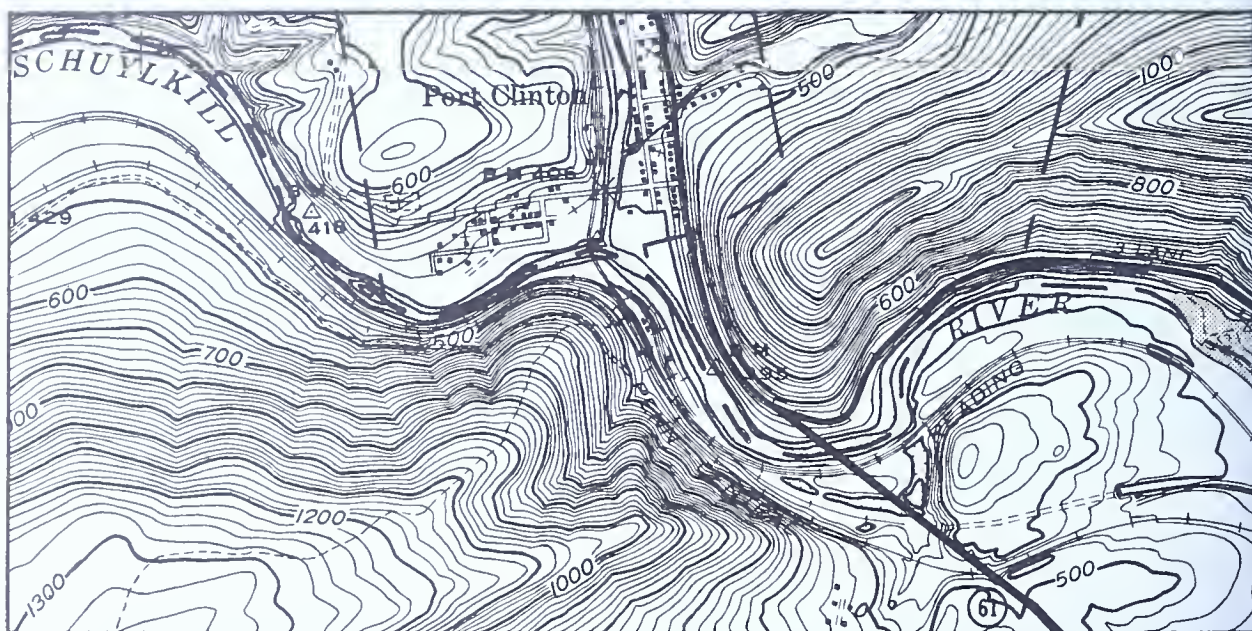
265. SCHUYLKILL GAP

COUNTIES: Schuylkill
and Berks

TOWNSHIPS: West Brunswick
(Schuylkill
County); Tilden
(Berks County)

QUADRANGLE: Auburn

LOCATION: One-half mile south of the center of the Borough of Port Clinton; 1.8 miles north of Interstate 78 and Pa. Route 61.



REMARKS: An outstanding example of a water gap in Blue Mountain; an exceptional exposure of the quartzites of the Tuscarora Formation (Silurian age) and a major fault which causes this formation to repeat.



REFERENCE: Burner, Roger, Weaver, Richard, and Wise, Donald (1958), *Structure and stratigraphy of Kittatinny Ridge at Schuylkill Gap, Pennsylvania*, Pennsylvania Academy of Science Proceedings, v. 32, p. 141-145.

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



266. SEVEN SPRING

COUNTY: Clinton

TOWNSHIP: Logan

QUADRANGLE: Millheim

LOCATION: At the U. S. Bureau of Fisheries, Lamar National Fish Hatchery on Fishing Creek; approximately 2.2 miles west of Tylersville and Pa. Route 880.

REMARKS: **Seven Spring** and **Ruhl Spring** (267) together make up the second largest spring system in Pennsylvania, having a flow of 14,000 gallons per minute. These springs issue from enlarged fracture openings in the Nealmont Limestone of Ordovician age.

REFERENCE: Flippo, H. N., Jr. (1974), *Springs of Pennsylvania*, Department of Environmental Resources, Office of Resources Management, Water Resources Bulletin 10, 46 p.



SEVEN SPRING

266. SEVEN SPRING (continued)



RUHL SPRING



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



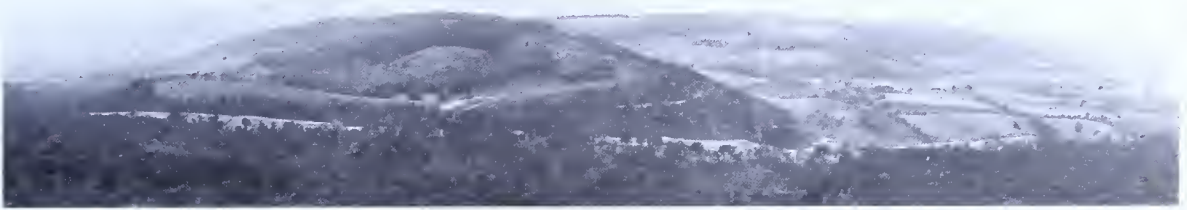
268 . SHAEFER OVERLOOK

COUNTY: Bedford

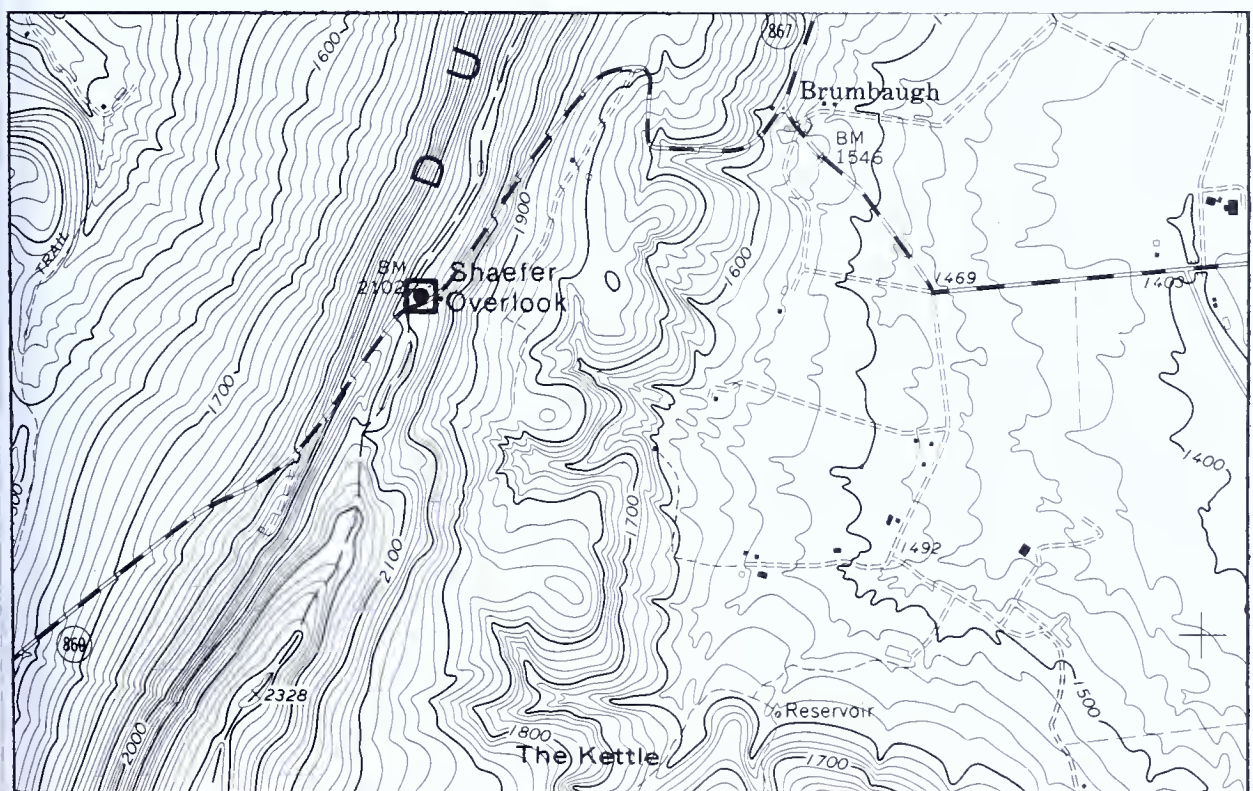
TOWNSHIP: King

QUADRANGLE: New Enterprise

LOCATION: On Pa. Route 869, approximately 4 miles west of New Enterprise and atop Dunning Mountain.



REMARKS: A breathtaking view (looking west) of the Valley and Ridge province. A sign at this site reads, "Dedicated to Charles 'Pop' Shaefer, 'This beautiful spot is to collect our thoughts of God's great goodness, not the waste of man.' " **The Kettle** (269), in south Woodbury Township, is visible from a site on the east side of the mountain crest.



270 . SHIKELLAMY OVERLOOK

COUNTY: Union

TOWNSHIP: Union

QUADRANGLE: Northumberland

LOCATION: Within Shikellamy State Park; along the Susquehanna River opposite the Borough of Northumberland.

REMARKS: Outstanding vista over the junction of the east and west branches of the Susquehanna River, and the Susquehanna River valley in central Pennsylvania. Outcrops of massive sandstone and conglomerate (Catskill Formation, Devonian age) may be found along the road to the overlook and at the Blue Hill picnic area.



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



271 . SINKING VALLEY LEAD-ZINC MINES

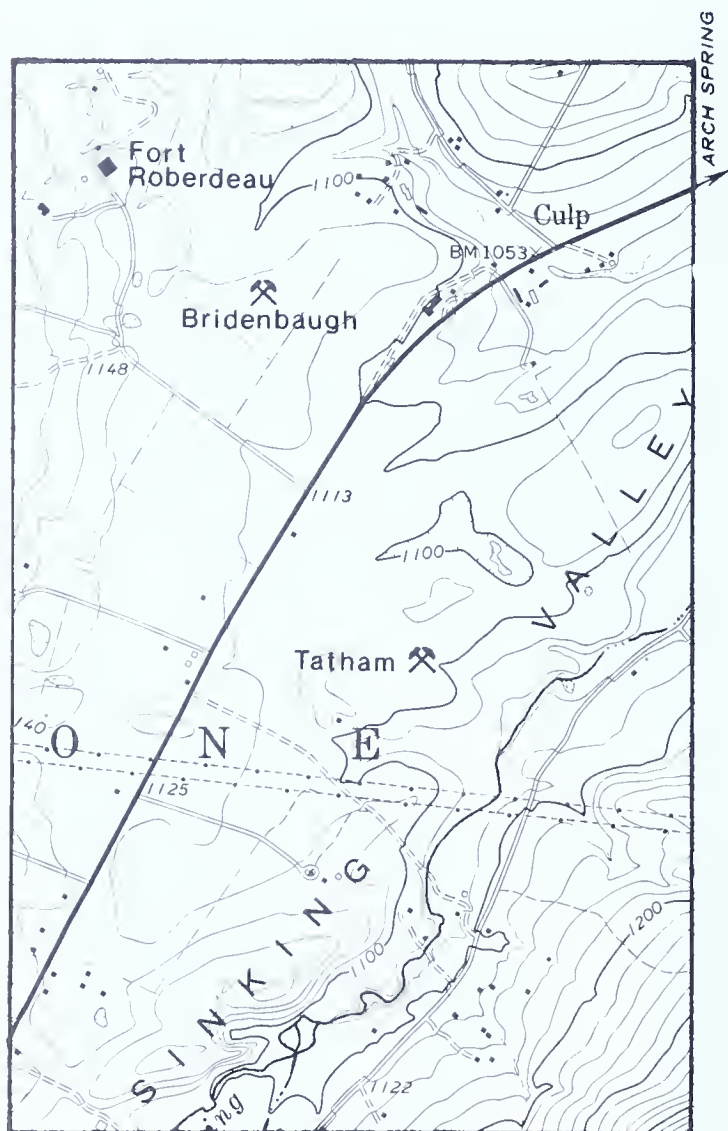
COUNTY: Blair

TOWNSHIP: Tyrone

QUADRANGLE: Bellwood

LOCATION: South and west of Culp.

REMARKS: The zinc-lead occurrences in Sinking Valley are located in Ordovician limestones and dolomites. Mineralization is localized along fractures; these fractures are filled with barite, sphalerite, galena, and calcite. Recent weathering altered much of the sphalerite to smithsonite and some of the galena to anglesite.



The American Revolution was already underway when the scarcity of lead for bullets threatened the fate of the colonies. Brigadier General Daniel Roberdeau took a leave of absence from his seat in the Continental Congress to come to the Sinking Valley area to find lead. Active mining began here in 1778. At his own expense, General Roberdeau built the fort that bears his name and had government militia installed to protect the lead miners. Also, settlers of the area found shelter at Fort Roberdeau during times of Indian un-

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



rest. As a Blair County bicentennial project, Fort Roberdeau has been reconstructed on the original site.

REFERENCES: Geyer, A. R., Smith, R. C., II, and Barnes, J. H. (1976), *Mineral collecting in Pennsylvania*, 4th ed., Pennsylvania Geological Survey, 4th ser., General Geology Report 33, p. 50-53.

Zeller, R. A., Jr, (1949), *The structural geology and mineralization of Sink-ing Valley, Pennsylvania*, M. S. thesis, The Pennsylvania State University, University Park, 71 p.



272. STONY RIDGE

COUNTY: Carbon

TOWNSHIPS: East Penn and Lower
Towamensing

QUADRANGLES: Lehighton and Palmerton

LOCATION: A 9.7-mile-long ridge between the village of Ashfield (west of the Lehigh River) and Little Gap (east of the Lehigh River).



REMARKS:

A 100-foot-thick ridge of hard white sandstone, devoid of soil and tree cover, stands like a jagged "wall." The sandstone is highly fractured (jointed), and weathering has produced a myriad of "stone figures" silhouetted against the sky. This feature is also known as **Rocky Ridge** and **Devils Wall**.

REFERENCES:

- Epstein, J. B., Sevon, W. D., and Glaeser, J. D. (1974), *Geology and mineral resources of the Lehigh and Palmerton quadrangles, Carbon and Northampton Counties, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Atlas 195cd, 460 p.
- Lesley, J. P. (1892), *A summary description of the geology of Pennsylvania*, Pennsylvania Geological Survey, 2nd ser., 1892 Summary Final Report, v. 2, p. 721-1128.

VALLEY AND RIDGE PROVINCE APPALACHIAN MOUNTAIN SECTION



272. **STONY RIDGE** (*continued*)

*Lehigh Water Gap as seen looking south from Rocky Ridge (Devil's wall) VIII
From Lehnann's picture in Geol. Pa., 1858.*



(From Lesley, 1892, p. 1062)

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



273. SULPHUR SPRING

COUNTY: Clinton

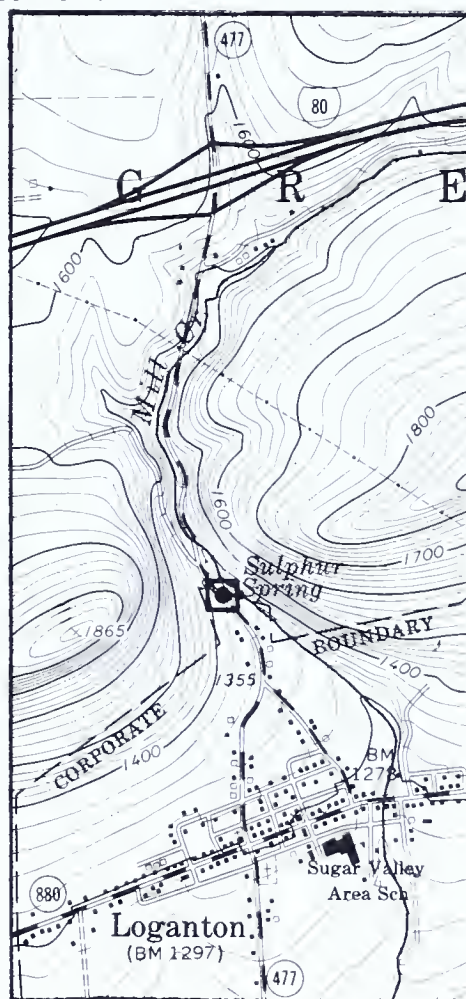
BOROUGH: Loganton

QUADRANGLE: Loganton

LOCATION: On the Green Township-Loganton Borough boundary, one-half mile south of Interstate 80, exit 27 (mile 185).

REMARKS: A sulfur spring located in a water gap in Sugar Valley Mountain. The spring is emanating from conglomerate of the Bald Eagle Formation (Ordovician age). A bright yellow coating of native sulfur is present on the walls of the spring opening.

REFERENCE: Bolles, W. H., and Geyer, A. R. (1975), *Pa. Interstate 80—geologic guide*, Pennsylvania Department of Education.



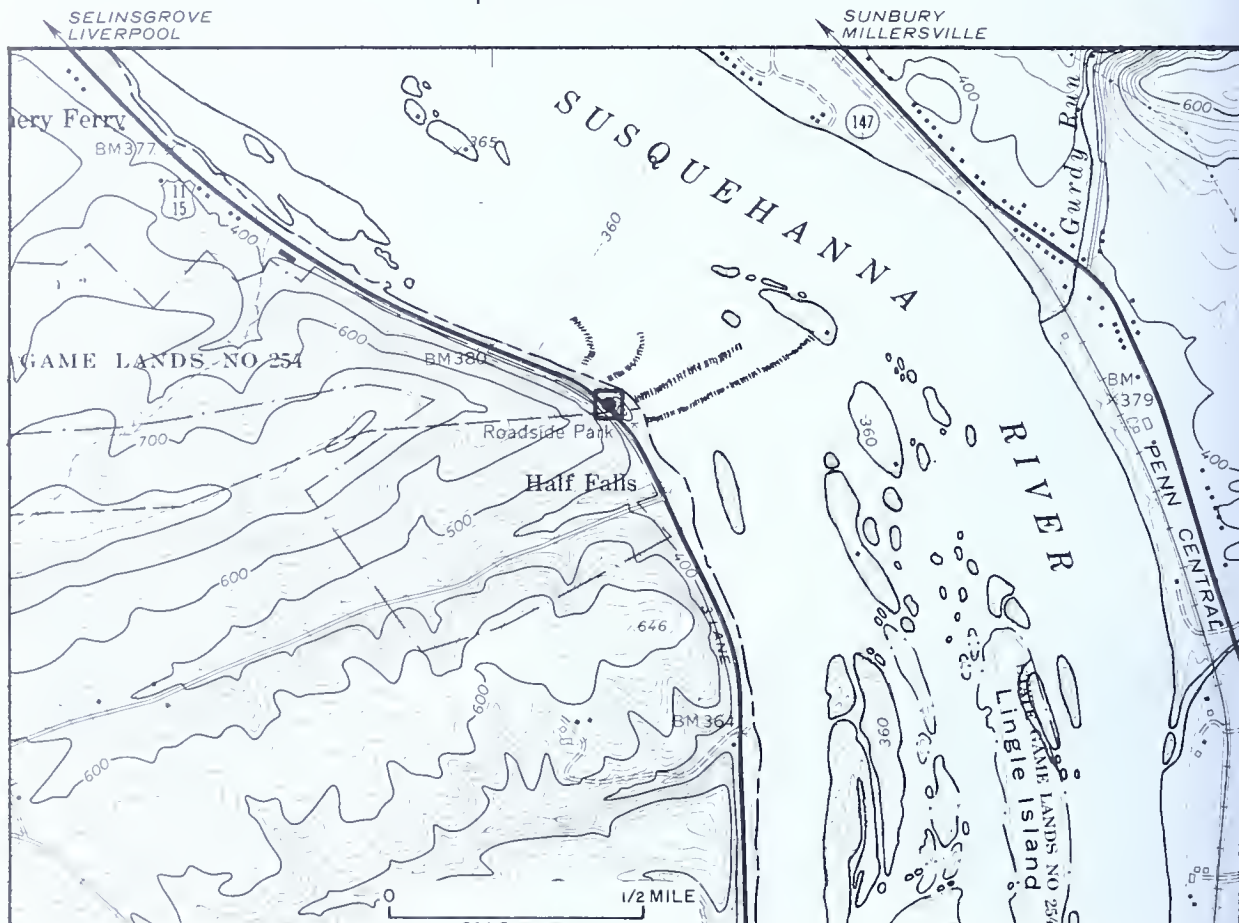
274. SUSQUEHANNA WATER GAPS

COUNTIES: Dauphin
and Perry

TOWNSHIPS: Middle Paxton (Dauphin County); Penn
and Rye (Perry County)

QUADRANGLE: Harrisburg West

LOCATION: Several miles north of Harrisburg along the Susquehanna River.



REMARKS:

The area of five water gaps along the Susquehanna River north of Harrisburg was designated as a registered National Natural Landmark. The geologic record of hundreds of millions of years is recorded in the rocks exposed in the five gaps, visible at a number of points on both sides of the river.

REFERENCES:

Ashley, G. H. (1931), *A syllabus of Pennsylvania geology and mineral resources*, Pennsylvania Geological Survey, 4th ser., General Geology Report 1, p. 79-80.

Pennsylvania Geology (1969), *Susquehanna Water Gaps dedicated*, v. 1, no. 2, p. 4-5.

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



(Photograph by Grant Heilman)

275. THE CLIFF

COUNTY: Pike

TOWNSHIP: Dingman

QUADRANGLE: Milford

LOCATION: Along the west side of U. S. Route 209 between Milford and Raymondskill Falls.

REMARKS: The Delaware River escarpment; scenic beauty. Shale of the Mahantango Formation (Devonian age) is fairly stable in near-vertical cliffs.



VALLEY AND RIDGE PROVINCE
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THE CLIFF

276. THE HOOK

COUNTY: Union

TOWNSHIP: Hartley

QUADRANGLE: Hartleton

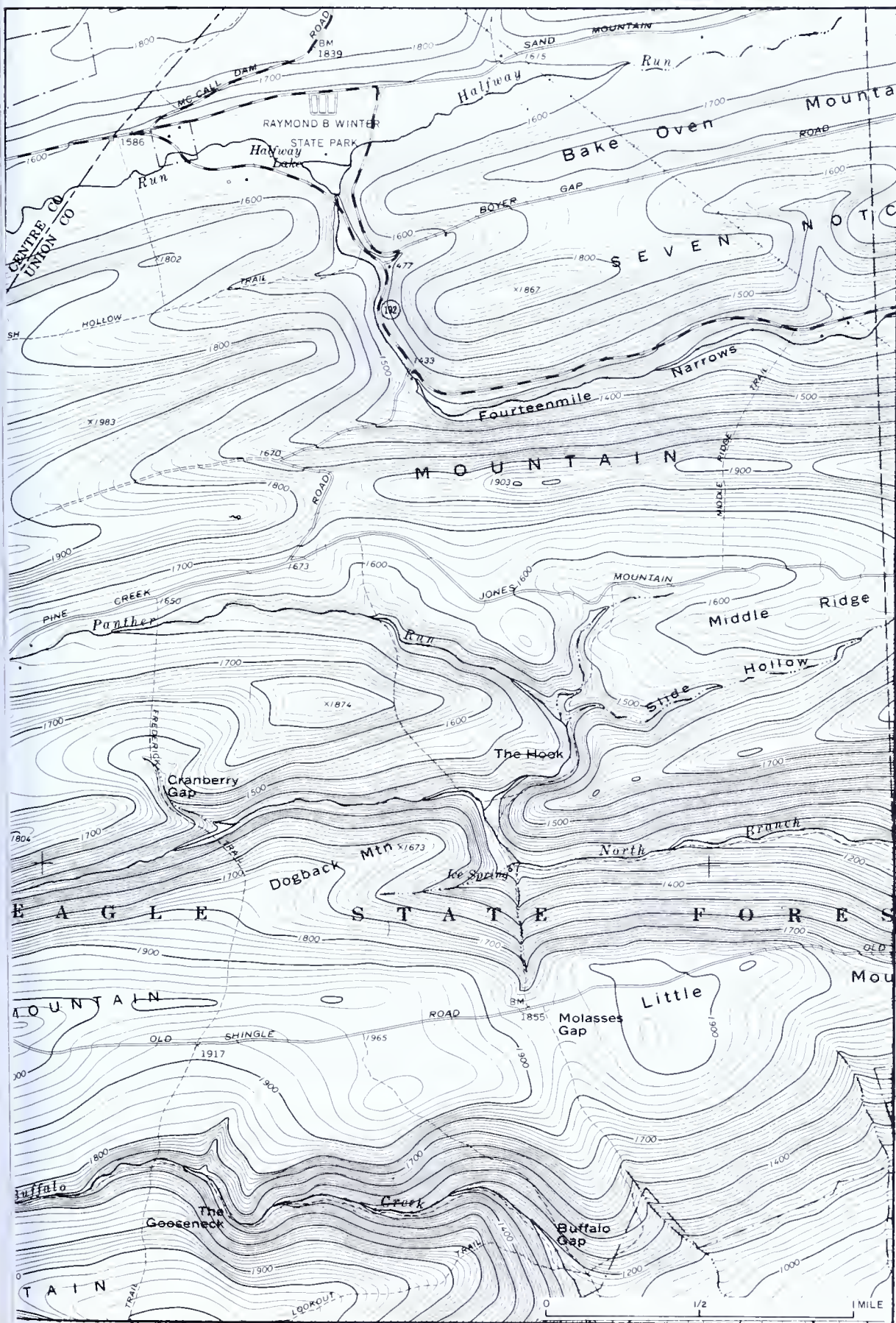
LOCATION: Five miles north of Laurelton.



REMARKS:

A curved water gap within topography that is the most representative example of Valley and Ridge terrain in the state; includes parallel stream valleys, portions of many ridges, spectacular water gaps, and a variety of springs, hollows, kettles, lakes, and upland flats.

VALLEY AND RIDGE PROVINCE APPALACHIAN MOUNTAIN SECTION



277. THE PINNACLE

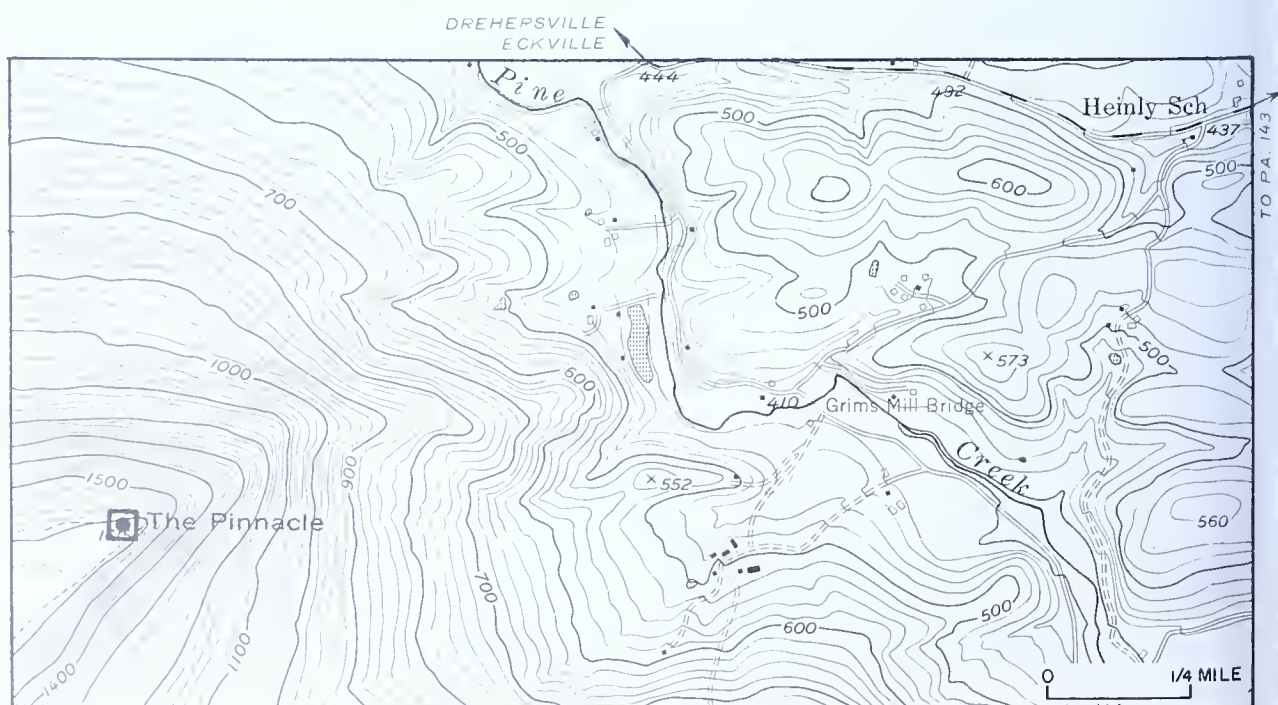
COUNTY: Berks

TOWNSHIP: Albany

QUADRANGLE: Hamburg

LOCATION: Approximately 3.0 miles north of Lenharts-ville on Blue Mountain.

REMARKS: Outcrops of hard, resistant quartzite (Tuscarora Formation, Silurian age) are exposed at the apex of a tight fold in the mountains. Weathering has produced a "spire" of quartzite; an excel-lent view of the Great Valley.





278. THE PINNACLE

COUNTY: Columbia

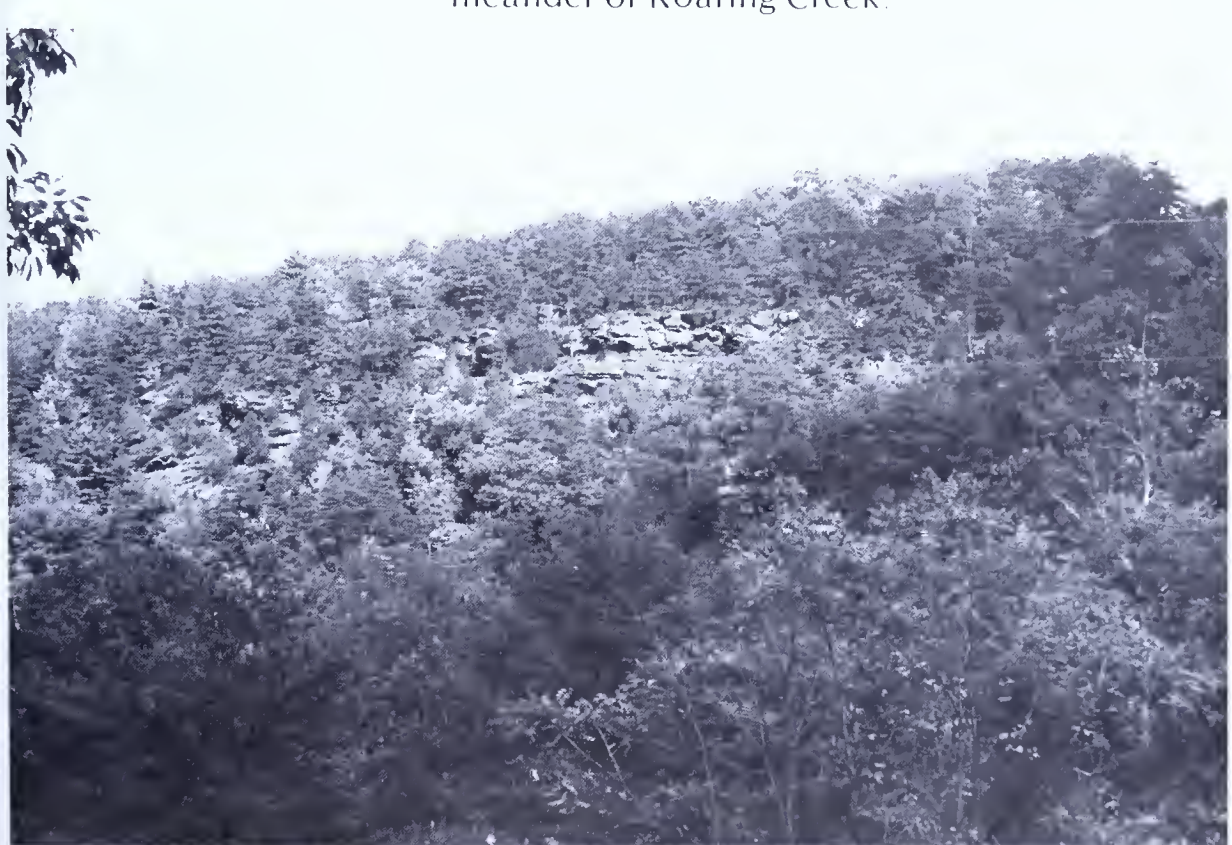
TOWNSHIP: Franklin

QUADRANGLE: Danville

LOCATION: Along Roaring Creek, about 1.6 miles south of the intersection of the Susquehanna River and Roaring Creek; 6 miles southeast of Danville

REMARKS: An ancient meander of Roaring Creek has almost been cut off; only a thin sliver of land, **Sharp Ridge** (279) (Montour County), remains. Today Roaring Creek flows into the Susquehanna River at a different location, and the west half of the meander is a stagnant lake. Outcrops of red and green siltstones (Catskill Formation, Devonian age) are exposed on the crest of the ridge.

A vertical cliff of red and green shales and siltstones (Catskill Formation) is exposed beneath **The Pinnacle**, another narrow strip in a meander of Roaring Creek.



THE PINNACLE

278. THE PINNACLE (continued)



VIEW WEST FROM SHARP RIDGE

VALLEY AND RIDGE PROVINCE

APPALACHIAN MOUNTAIN SECTION

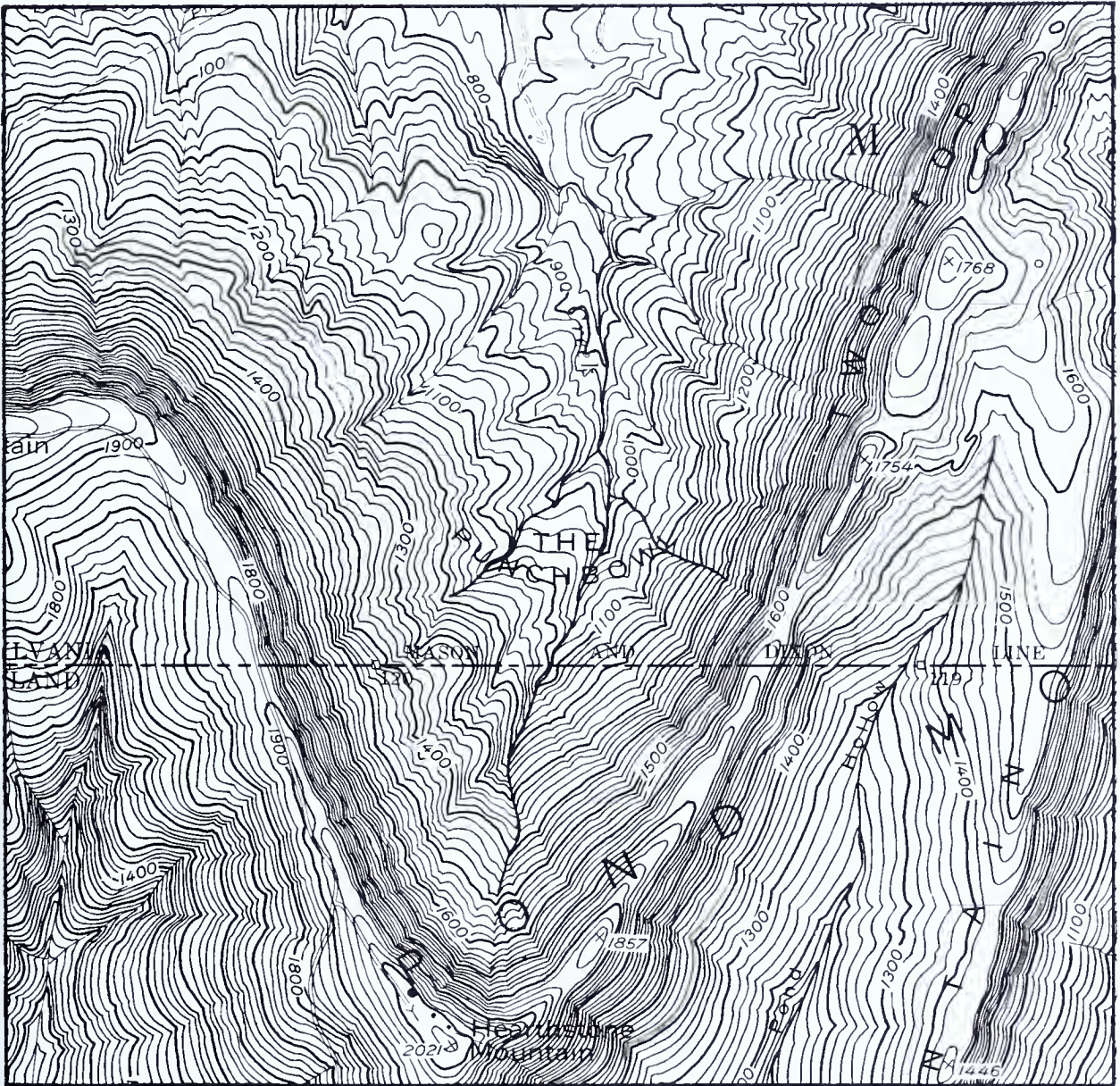


280. THE PUNCHBOWL

COUNTY: Franklin

TOWNSHIP: Montgomery

QUADRANGLE: Clear Spring



LOCATION:

On the Mason and Dixon Line (Pennsylvania-Maryland boundary), 8 miles southwest of Mercersburg.

REMARKS:

Soft, easily weathered shales (Ordovician age) in the center of a south-plunging anticline have been eroded to expose a large amphitheater-like feature (called "The Punchbowl") surrounded by high ridges of hard, resistant quartzite (Tuscarora Formation, Silurian age).

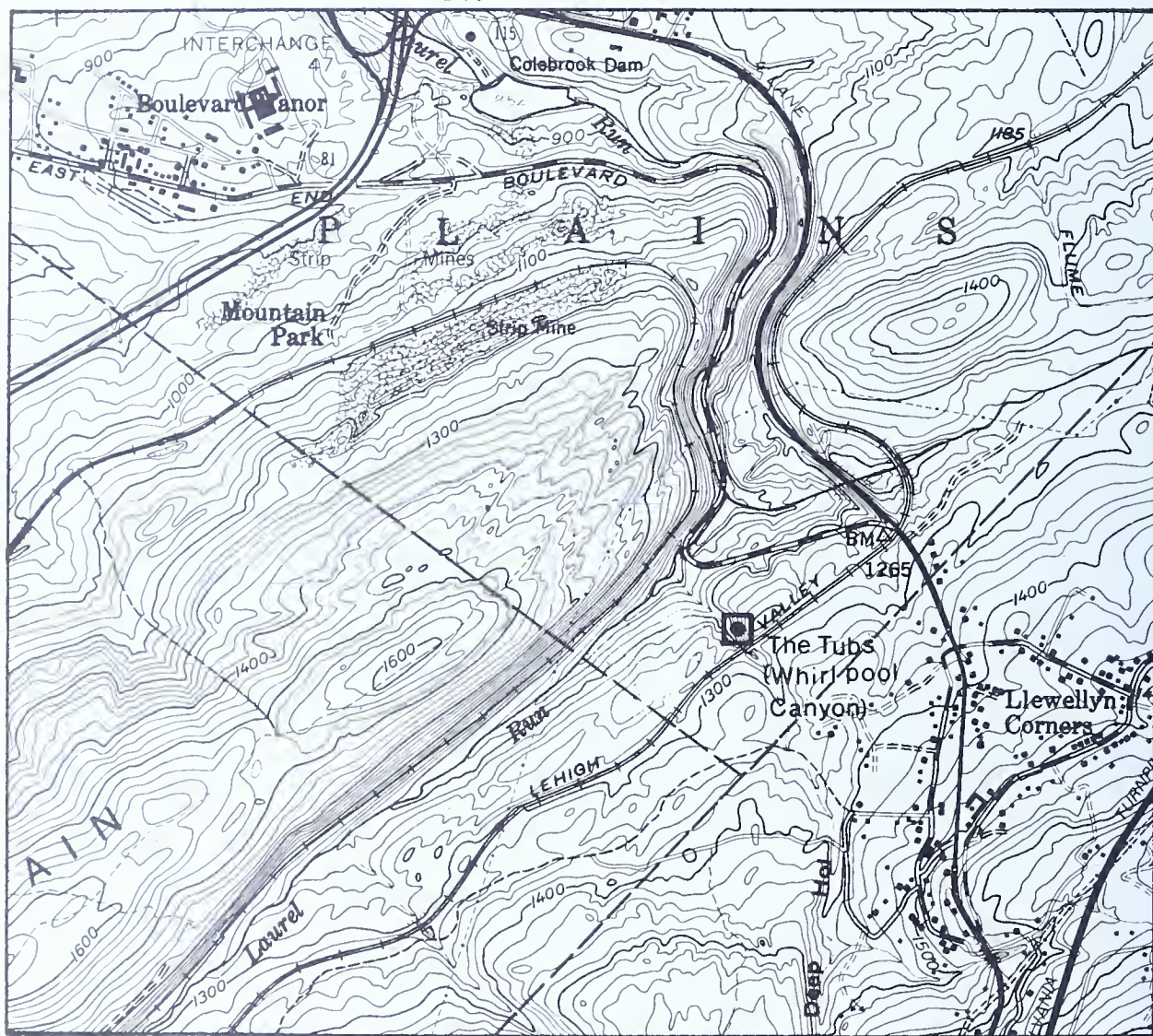
281. THE TUBS (WHIRLPOOL CANYON)

COUNTY: Luzerne

TOWNSHIP: Plains

QUADRANGLE: Wilkes-Barre East

LOCATION: About 900 feet south of Old East End Boulevard; 0.35 mile west of Pa. Route 115; 1.2 miles southeast of interchange 47 of Interstate 81.



REMARKS:

Whirlpool Canyon contains a series of seven glacial potholes in the channel of Wheelbarrow Run. They were formed during the Pleistocene Epoch (10,000 years ago) when a meltwater stream flowing through the glacier plunged

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



over the front edge of the ice or over an ice cliff within the glacier. The volume of meltwater, hydrostatic pressure, and abrasive action of rock fragments etched tub-like potholes up to 30 feet across and 20 feet deep in the sandstone and conglomerate of the Pocono Formation (Mississippian age). As the glacier receded, a series of seven potholes and a gorge were left exposed.



(Photographs by Wilkes College Committee for a Clean Environment)

281. THE TUBS (*continued*)



REFERENCES:

Bohlin, Annie (1978), Personal communication of existence of feature and its location, Wilkes-Barre, Pennsylvania.

Luzerne County Planning Commission (1976), *A plan for the preservation of Whirlpool Canyon*, Wilkes-Barre, Pennsylvania.



282. TROUGH CREEK GORGE

COUNTY: Huntingdon

TOWNSHIP: Todd

QUADRANGLE: Entriiken

LOCATION: Trough Creek State Park, approximately 2 miles north of Pa. Route 994 near Newburg.

REMARKS: A deeply intrenched stream flows through horizontally bedded, yellow-brown sandstones, siltstones, and conglomerates of the Pocono Formation (Mississippian age) in a synclinal basin. The gorge has waterfalls, spectacular cliffs, meanders, and geologically interesting **Balanced Rock** (283), **Ice Cave** (284), and **Copperas Rock** (285).

REFERENCE: Wilshusen, J. P. (1969), *Trough Creek State Park: Ice mine and balanced rock*, Pennsylvania Geological Survey, 4th ser., Park Guide 1.



COPPERAS ROCK

282. TROUGH CREEK GORGE *(continued)*

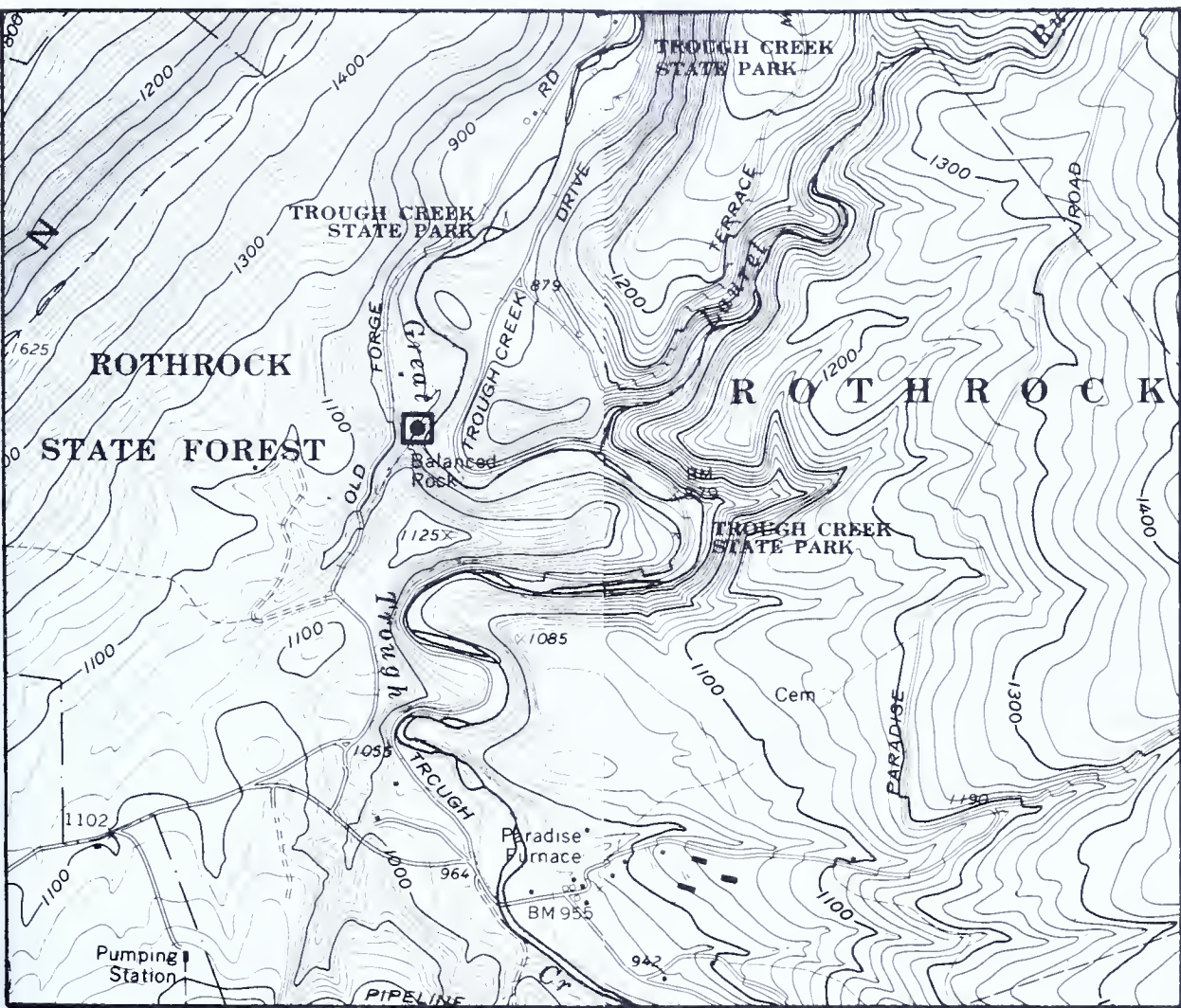


BALANCED ROCK



TROUGH CREEK GORGE

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



ICE CAVE

286. TUSCARORA SUMMIT

COUNTY: Franklin-Fulton
County line

TOWNSHIPS: Peters (Franklin
County); Ayr
(Fulton County)

QUADRANGLE: McConnellsburg

LOCATION: Approximately 2 miles east of McConnellsburg
on U. S. Route 30.

REMARKS: A breathtaking view (west) from atop Tuscarora
Mountain; elevation 2123 feet. The Tuscarora
quartzite (Silurian age) underlies the summit
and, due to its hardness and extreme resistance
to weathering, is responsible for the high moun-
tain. **Cape Horn** (287), on the south side of the
highway at the parking area, provides an excel-
lent view to the north.

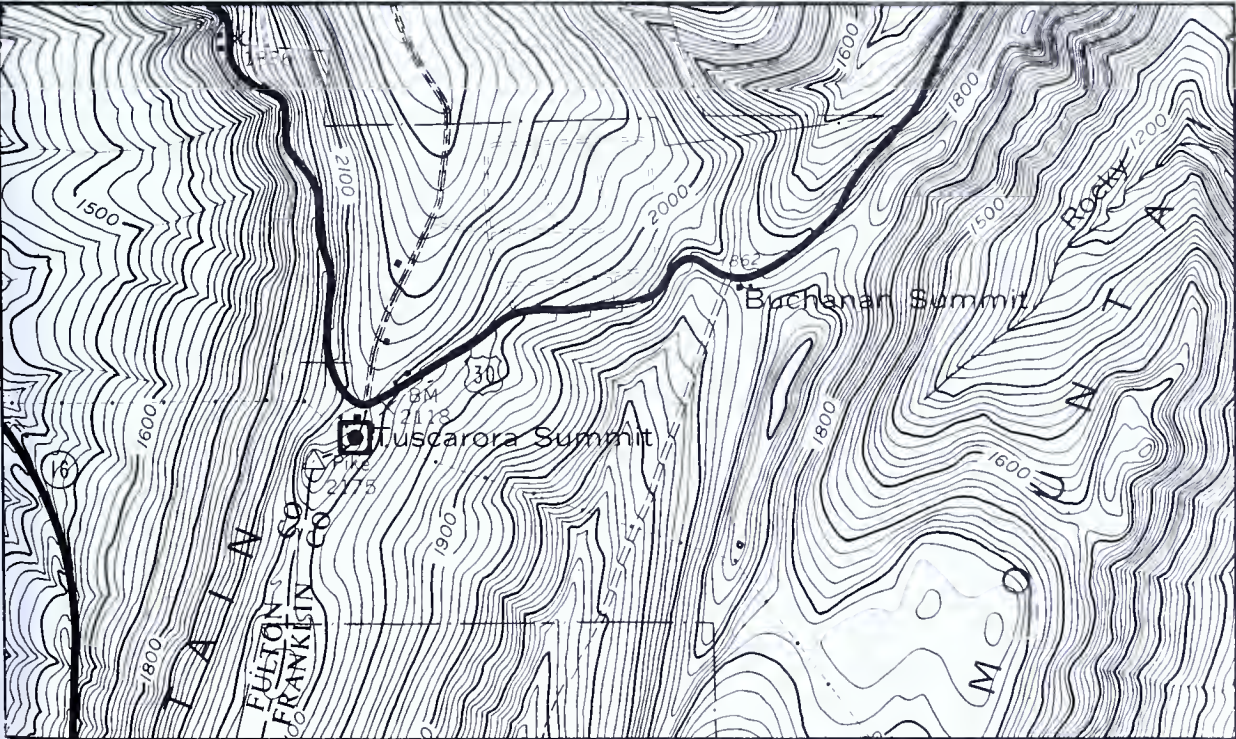


VIEW FROM CAPE HORN

VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



TUSCARORA SUMMIT VIEW

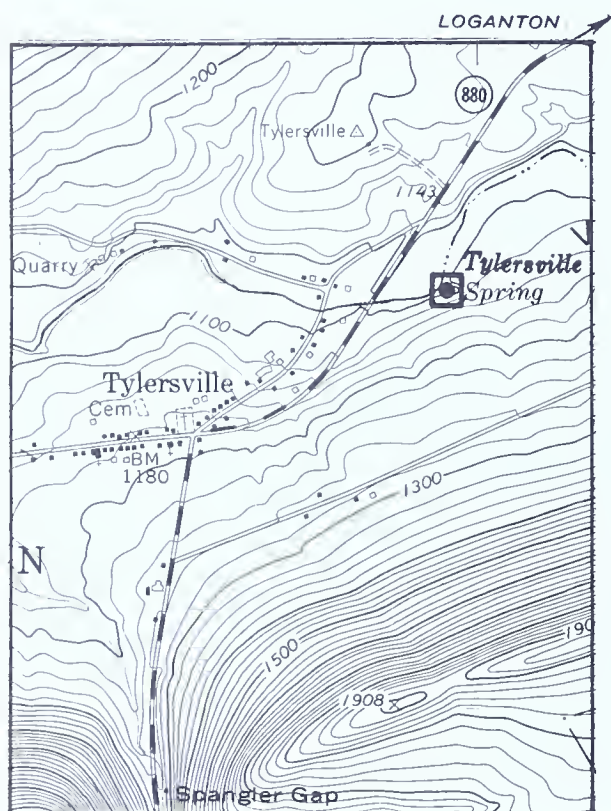


288. TYLERSVILLE SPRING

COUNTY: Clinton

TOWNSHIP: Logan

QUADRANGLE: Millheim



LOCATION: Near the head of Fishing Creek, about one-half mile northeast of the village of Tylersville; approximately 600 feet east of Pa. Route 880.

REMARKS: The fourth largest spring in Pennsylvania, having a median flow of 13,000 gallons per minute. The spring rises from fractures in the limestone of the Nealmont Formation (Ordovician age).

REFERENCE: Flippo, H. N., Jr. (1974), *Springs of Pennsylvania*, Department of Environmental Resources, Office of Resources Management, Water Resources Bulletin 10, 46 p.



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



289. WALLPACK BEND

COUNTY: Monroe

TOWNSHIP: Middle Smithfield

QUADRANGLE: Flatbrookville

LOCATION: Approximately 1.5 miles east of U. S. Route 209 at Bushkill.



REMARKS:

The largest meander in the Delaware River and one of the best examples of this feature in the state; wild and scenic.

290. WHALEBACK

COUNTY: Northumberland

TOWNSHIP: Coal

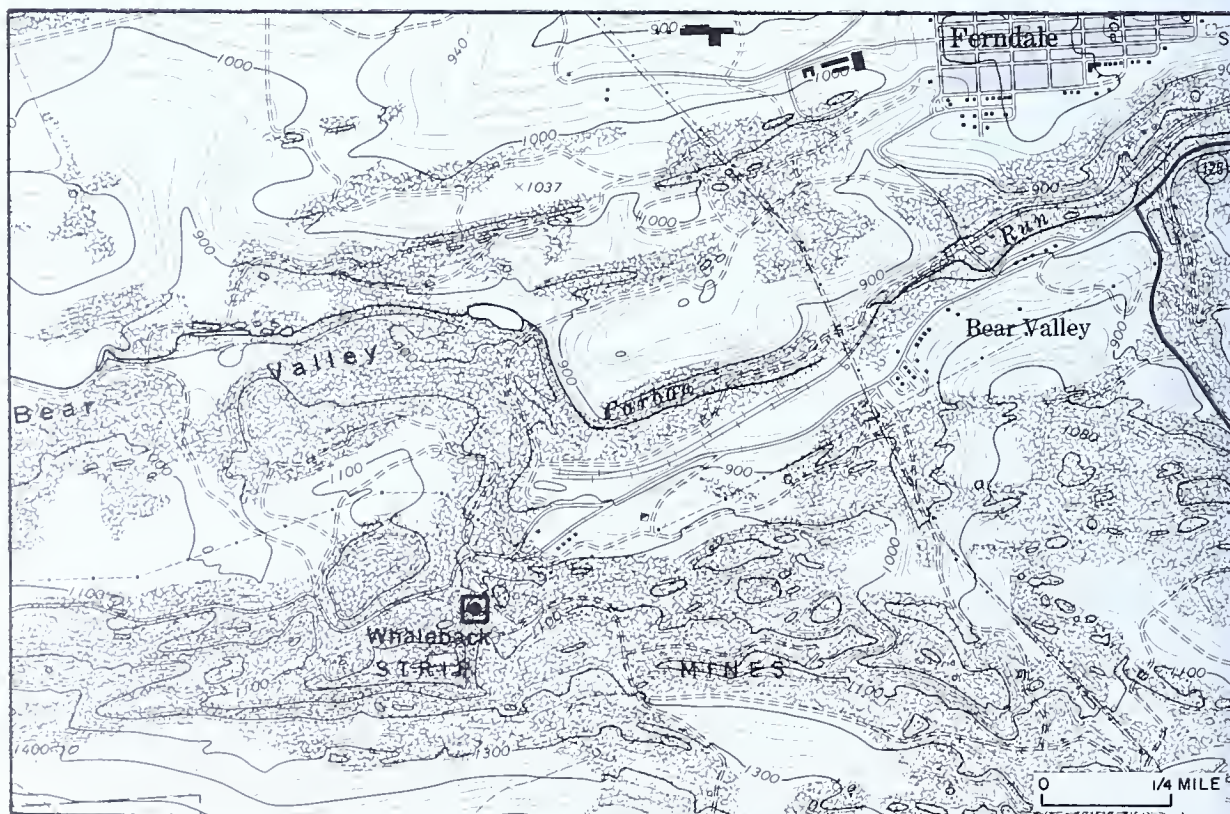
QUADRANGLE: Shamokin

LOCATION: Bear Valley strip mine about 3 miles southwest of Shamokin.

REMARKS: The "whaleback" is a unique combination of rock folding, faulting, and weathering that resembles the shape of a whale's back.

The rock sequence in the Bear Valley strip mine is part of the Llewellyn Formation. It consists of conglomerate, sandstone, mudstone, anthracite, and interbedded shale and sandstone or siltstone.

It is geologically significant in that all recognized structural stages of the Allegheny orogeny in the northern Valley and Ridge province are visible at this site. All structural stages



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



are superimposed at one place; progressive deformation and the relative time of formation of joints, rock cleavage, minor folds, faults, and major folds can be proved.

REFERENCES:

- Arndt, H. H., Danilchik, Walter, and Wood, G. H., Jr. (1963), *Geology of anthracite in the western part of the Shamokin quadrangle, Northumberland County, Pennsylvania*, U. S. Geological Survey Coal Investigations Map C-47.
- Arndt, H. H., Wood, G. H., Jr., and Schryver, R. F. (1973), *Geologic map of the south half of the Shamokin quadrangle, Northumberland and Columbia Counties, Pennsylvania*, U. S. Geological Survey Miscellaneous Geologic Investigations Map I-734.
- Nickelsen, R. P. (1976), *Sequence of structural stages of the Allegheny orogeny, at the Bear Valley strip mine, Shamokin, Pennsylvania*, unpublished manuscript, Department of Geology, Bucknell University, Lewisburg, Pennsylvania.

NOTES:

291. WILLIAMSPORT SCENIC VISTAS

COUNTY:	Lycoming	TOWNSHIP:	Armstrong
QUADRANGLE:	Montoursville South		
LOCATION:	A large scenic overlook is adjacent to U. S. Route 15 on Bald Mountain, approximately 4 miles east of the city of Williamsport. Several other vistas are located along Skyline Drive on North White Deer Ridge in Tiadaghton State Forest.		
REMARKS:	Lookouts provide excellent, highly scenic vistas of the Susquehanna River valley, the Allegheny Front, and the Allegheny High Plateau. Highly resistant quartzite (Tuscarora Formation, Silurian age) underlies and accounts for the high elevations of North White Deer Ridge and the northern slope of Bald Eagle Mountain.		
REFERENCE:	Faill, R. T. (in press), <i>Geology and mineral resources of the Montoursville South and Muncy quadrangles and part of the Hughesville quadrangle, Lycoming, Northumberland, and Montour Counties, Pennsylvania</i> , Pennsylvania Geological Survey, 4th ser., Atlas 144ab.		
NOTES:			

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APPALACHIAN MOUNTAIN SECTION



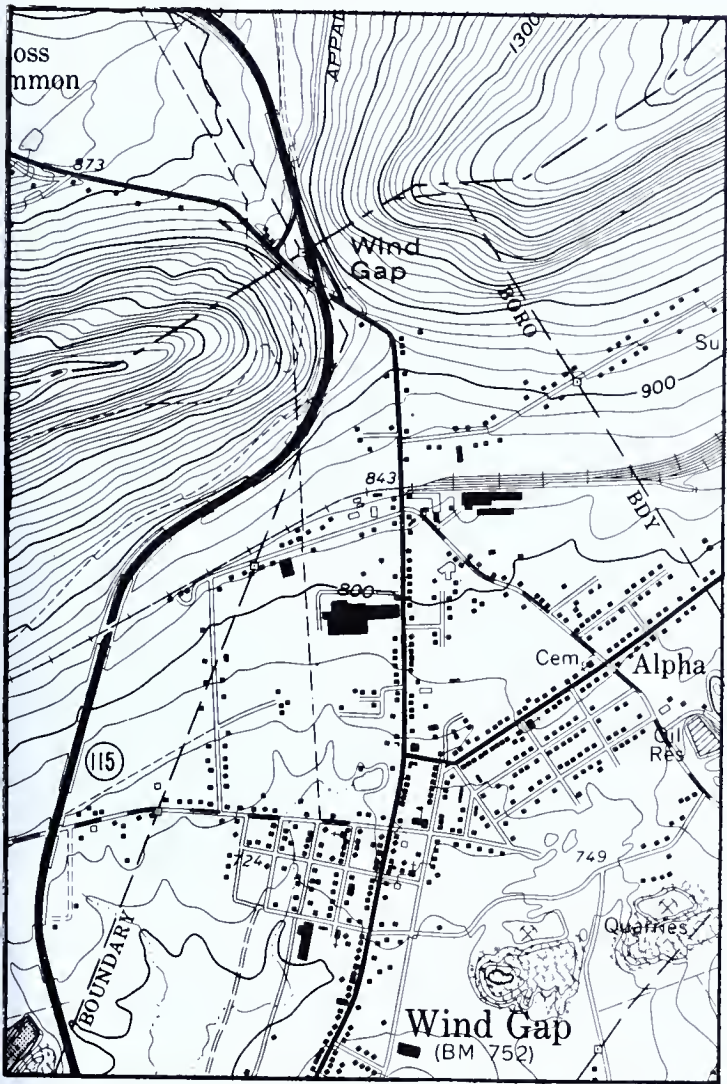
291. WILLIAMSPORT SCENIC VISTAS *(continued)*



VALLEY AND RIDGE PROVINCE
APPALACHIAN MOUNTAIN SECTION



292. WIND GAP



COUNTY: Northampton

BOROUGH: Wind Gap

QUADRANGLE: Wind Gap

LOCATION: Within the Borough of Wind Gap in Blue Mountain.

REMARKS: The best example of a "wind gap" in Pennsylvania. A wind gap is a major "cut" through a ridge through which no river flows.



293. WINONA FALLS

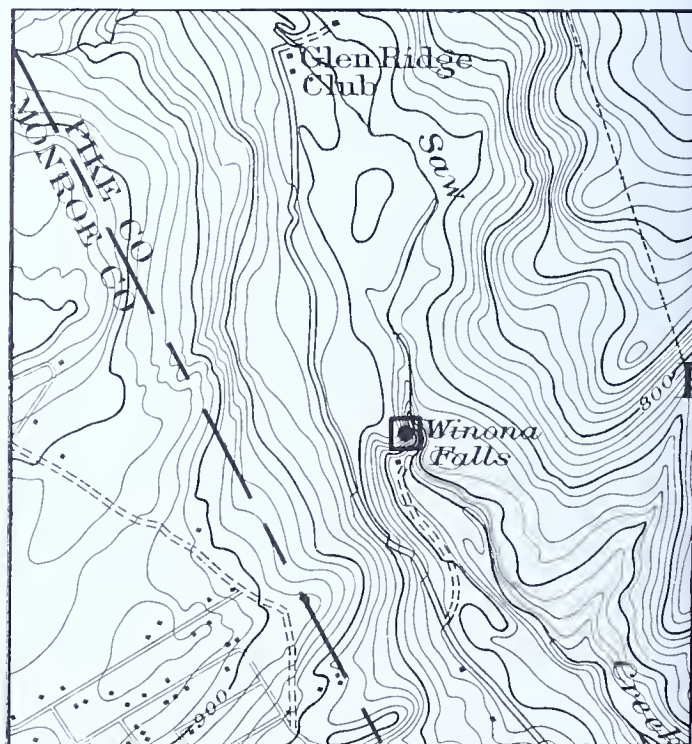
COUNTY: Pike

QUADRANGLE: Bushkill

LOCATION: Along Saw Creek, approximately 2.4 miles north of the village of Shoemakers and U. S. Route 209.

REMARKS: Saw Creek descends over a series of waterfalls which are highly scenic and which, based on their height and width and the number of falls, represent the finest examples in Pennsylvania.

REFERENCE: Alvord, D. C., and Drake, A. A., Jr. (1971), *Geologic map of the Bushkill quadrangle, Pennsylvania-New Jersey*, U.S. Geological

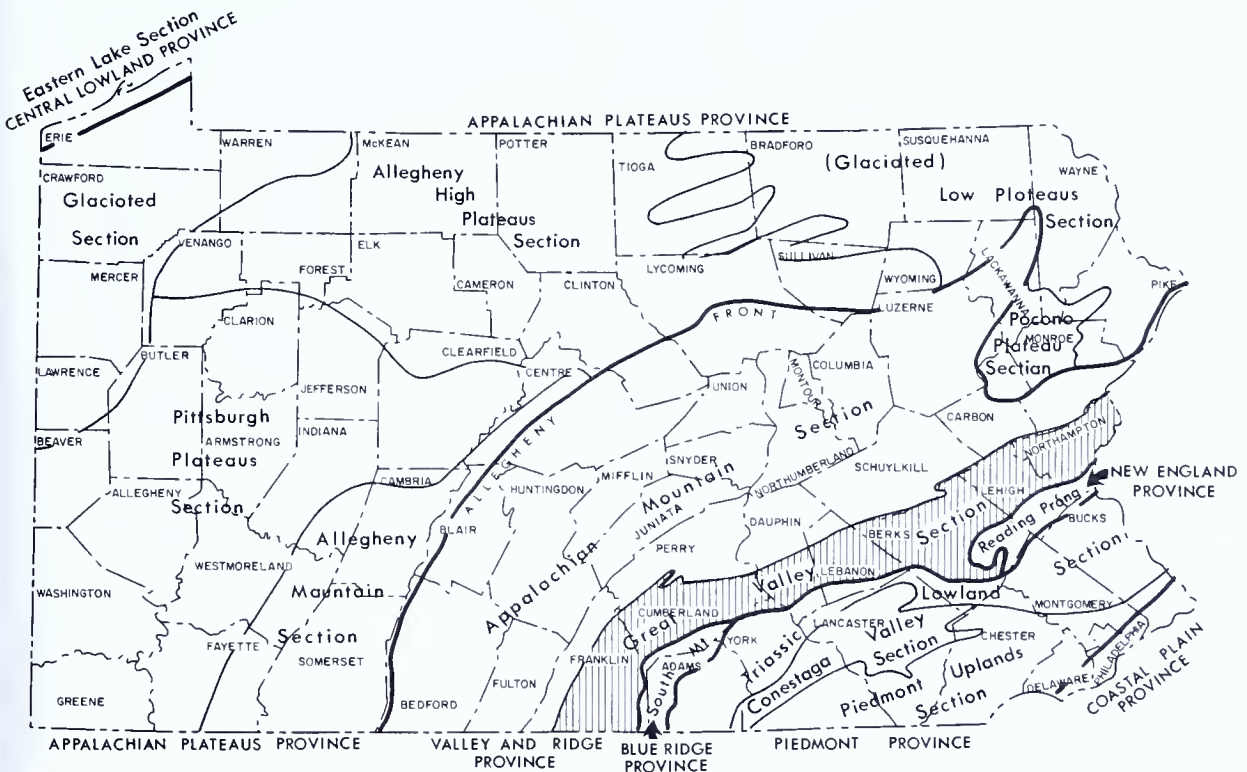


VALLEY AND RIDGE PROVINCE— GREAT VALLEY SECTION

TOPOGRAPHY

The Great Valley section derives its name from the fact that it is an almost continuous valley from New York to Georgia. In south-central Pennsylvania it is called the Cumberland Valley, whereas to the north and east it is known as the Lebanon Valley and farther east as the Lehigh Valley. In Maryland it is known as the Hagerstown Valley and, in Virginia, the famous Shenandoah Valley.

The Great Valley can be divided both topographically and geologically into two belts: (1) The area that borders the Appalachian Mountain section is underlain by Ordovician shales, siltstones, and sandy beds characterized by rolling hills and well-developed drainage. Large permanent streams are generally restricted to this shale area and meander in small steep-walled valleys. The shale terrain is 100 to 150 feet higher than the adjacent limestone due to its greater resistance to erosion. (2) Moving away from the shale boundary the rocks of the valley that form the second belt are Cambrian and Ordovician limestones and dolomites that result in a low, flat, gently rolling terrain; the low relief is due entirely to the solubility of the thick sequence of carbonate rocks. Disappearing streams, sinkholes, and



OUTSTANDING SCENIC GEOLOGICAL FEATURES OF PENNSYLVANIA

caves are typical karst topographic features. A thick soil cover makes the valley very fertile, and large, prosperous farms are abundant. The rock sequence generally becomes successively younger as the boundary of the Appalachian Mountain section is approached.

ROCK COLUMN

With the exception of isolated, discontinuous diabase dikes of Triassic and Jurassic ages, the exposed bedrock of the Great Valley is sedimentary in origin and from Cambrian to Upper Ordovician in age. Some surficial deposits occur as alluvium in stream valleys and as colluvium 200 to 300 feet thick along the margins of Blue Mountain and South Mountain. The thickness of the carbonate rock sequence is about 13,000 feet.

SYSTEM	ROCK UNIT	DESCRIPTION
CUMBERLAND VALLEY SEQUENCE:		
Ordovician	Martinsburg Formation	Black shale; weathers buff.
	Chambersburg Formation	Dark-gray cobbly limestone.
	St. Paul Group	Fossiliferous limestone, black chert, and dolomite.
	Beekmantown Group	
	Pinesburg Station	Light-colored thick-bedded dolomite; includes some limestone.
	Formation	
	Rockdale Run	Mostly limestone; some dolomite; some chert; at base
	Formation	500 feet of pinkish limestone and chert.
Cambrian	Stonehenge Formation	Fossiliferous limestone.
	Stoufferstown Formation	Coarse limestone containing dark-gray siliceous seams; prominent ridge former.
	Conococheague Group	
	Shadygrove Formation	Pure, light-colored limestone; abundant pinkish limestone and cream-colored chert.
	Zullinger Formation	Interbanded limestone and dolomite; several thin local quartz sand beds.
	Elbrook Formation	Light-colored limy shale and silty limestone; blue limestone and dolomite; pure, dark limestone at base.
	Waynesboro Formation	Thin red sandy limestone; middle portion is blue limestone.
	Tomstown Dolomite	Dolomitic limestone; silty dolomite in middle part
LEBANON VALLEY SEQUENCE:		
Ordovician	Martinsburg Formation	Light-gray shale, sandstone, red shale, and interbedded gray shale and platy limestone.
	Hershey Limestone	Dark-gray thin-bedded limestone.
	Myerstown Limestone	Gray thin-bedded limestone; black graphitic limestone at base.
	Annville Limestone	Light-gray limestone; high calcium (pure); massive bedded.

VALLEY AND RIDGE PROVINCE

GREAT VALLEY SECTION



SYSTEM	ROCK UNIT	DESCRIPTION
Ordovician	Beekmantown Group	
	Ontelaunee Formation	Medium-gray massive-bedded dolomite; chert at base.
	Epler Formation	Medium-gray limestone interbedded with dolomite; cherty; fossiliferous.
	Rickenbach Formation	Medium-gray dolomite, cherty, sandy
Cambrian	Stonehenge Formation	Gray limestone, cherty; thin shaly beds; "flat-pebble" breccia beds
	Conococheague Group	
	Richland Formation	Medium-gray dolomite, cherty, oolitic, sandy; some "flat-pebble" breccia beds.
	Millbach Formation	Pinkish-colored limestone, oolitic; cryptozoon reefs; interbedded dolomite.
	Schaeferstown Formation	Medium-gray thin-bedded limestone.
	Snitz Creek Formation	Medium-gray dolomite, sandy, cherty
	Buffalo Springs Formation	Pinkish-gray limestone; cryptozoon reefs; sandy; interbedded dolomite.
	Tomstown Formation	Massive dolomite, sandy.
LEHIGH VALLEY SEQUENCE:		
Ordovician	Martinsburg Formation	
	Pen Argyl Member	Thick-bedded dark-gray slate.
	Ramseyburg Member	Interbedded sequence of dark-gray thick-bedded graywacke and siltstone
	Bushkill Member	Thin-bedded dark-gray slate. Unit contains minor thin beds of siltstone, black slate, and dolomitic siltstone
	Jacksonburg Formation	Dark-gray thin-bedded silty limestone; medium-gray high-calcium (pure) limestone.
	Beekmantown Group	Dark-gray dolomite and some interbedded limestone containing nodules and lenses of chert.
	Allentown Formation	Light-gray dolomite and some interbedded limestone. Formation is characterized by alternating light and dark beds
Cambrian	Leithsville Formation	Dark-gray buff-weathering dolomitic limestone and limy shale, in places phyllite. Occurs on or near the flanks of South Mountain.

ROCK STRUCTURE

The geologic structure of the Great Valley is varied and complex. Variations and generalizations may be best described from Franklin County, in south-central Pennsylvania, north and east to Northampton County and the Delaware River.

In Franklin County the Cumberland Valley limestones are part of the South Mountain anticlinorium and were involved in the related folding and faulting with the Catoctin greenstones of South Mountain. Most major faults are high-angle reverse faults; some are traceable for more than 30

OUTSTANDING SCENIC GEOLOGICAL FEATURES OF PENNSYLVANIA

miles. Although the structural geology is complex it is extremely regular and maintains this regularity north to the Lebanon Valley.

The main structural feature in the rocks of the Lebanon Valley is a large overturned fold upon which are imposed minor local folds. This fold system extends about 60 miles along strike and is about 11 miles wide near Lebanon, where a maximum rock thickness is exposed.

The structure of the rocks east of the Lebanon Valley (from Womelsdorf to the Delaware River) is the result of several periods of folding and thrust faulting related to both the Taconic orogeny (Late Ordovician) and the Alleghanian orogeny (Late Paleozoic).



VALLEY AND RIDGE PROVINCE

GREAT VALLEY SECTION



294. BIG SPRING

COUNTY: Cumberland

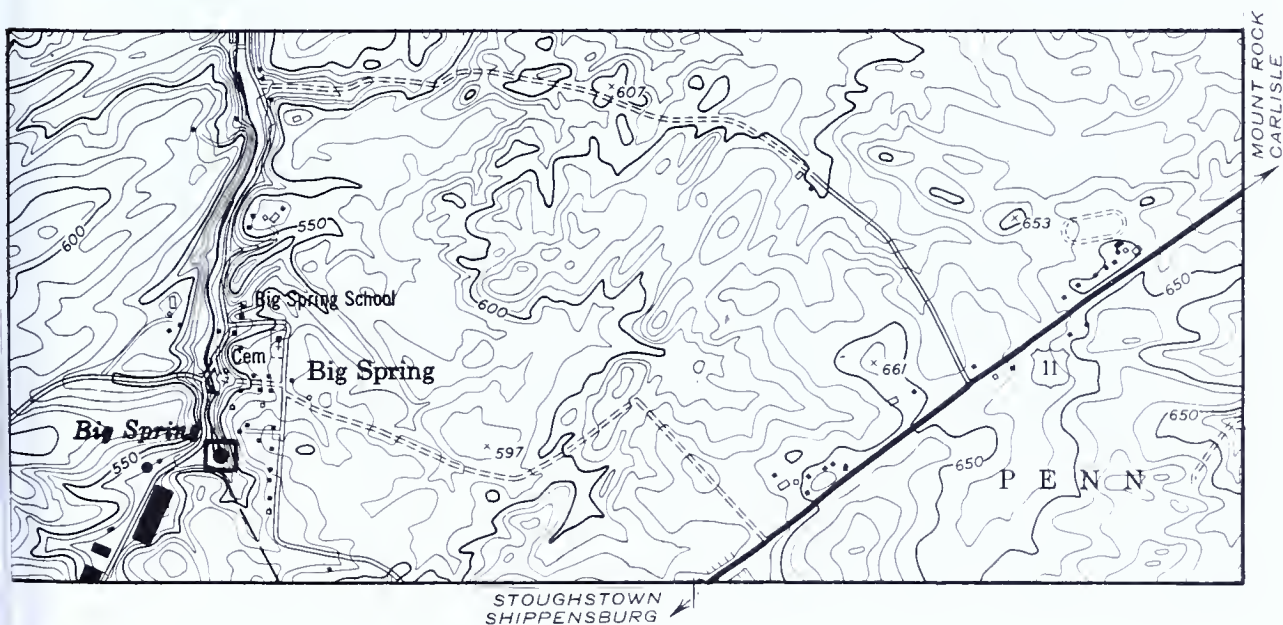
TOWNSHIP: West Pennsboro

QUADRANGLE: Newville

LOCATION: The head of Big Spring Creek in the village of Big Spring; approximately 3 miles south of the Borough of Newville. The spring is owned and used by the Pennsylvania Fish Commission for the Big Spring Trout Hatchery.

REMARKS: The fifth largest spring in Pennsylvania, having a median flow of 12,500 gallons per minute. The spring rises from fractures in the limestone and dolomite of the Beekmantown Group (Ordovician age).

REFERENCE: Flippo, H. N., Jr. (1974), *Springs of Pennsylvania*, Department of Environmental Resources, Office of Resources Management, Water Resources Bulletin 10, 46 p.



294. **BIG SPRING** (*continued*)



BIG SPRING



295. BOILING SPRINGS

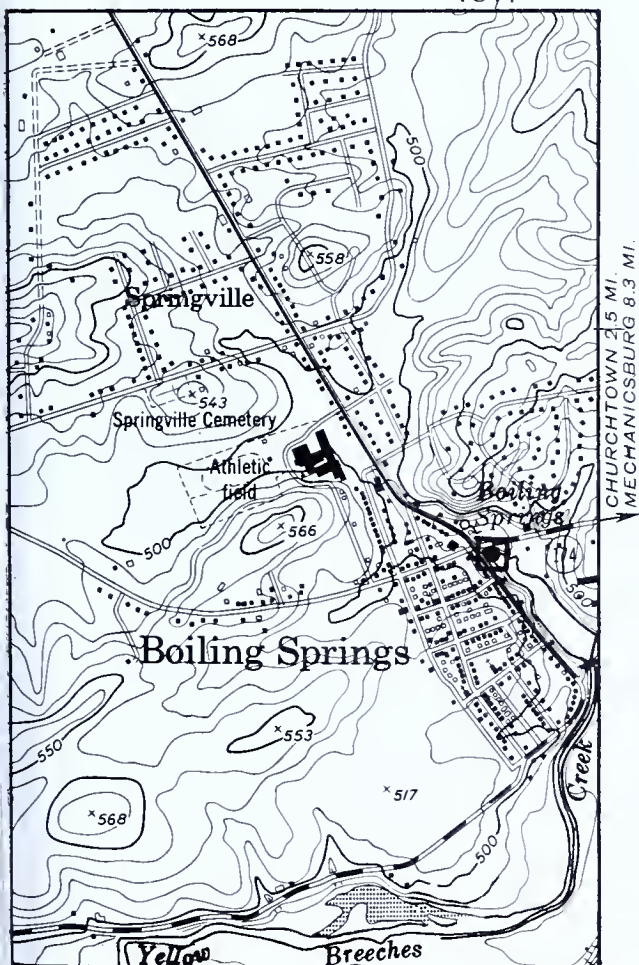
COUNTY: Cumberland

TOWNSHIP: South Middleton

QUADRANGLE: Carlisle

LOCATION: At the head of a small lake in the village of Boiling Springs; the site of a community park.

REMARKS: Boiling Springs, which has a median flow of 11,500 gallons per minute, ranks seventh in size of springs in the Commonwealth. It is one of the most picturesque springs in the Great Valley.



The origin of these springs is unique: the folded Cambrian limestones and dolomites of the Elbrook Formation have been injected by a near-vertical, thin diabase dike. This diabase is almost impervious and acts as a hydrologic barrier. At Boiling Springs the dike splits into two segments, so that the village is located in the interior apex of a "V" formed by the dikes. The direction of groundwater flow is to the north and east from the higher elevations on South Mountain. Groundwater becomes progressively confined between the two dikes until it "boils" forth from two main springs near the apex.

- REFERENCES: Flippo, H. N., Jr. (1974), *Springs of Pennsylvania*, Pennsylvania Department of Environmental Resources, Office of Resources Management, Water Resources Bulletin 10, 46 p.
- Root, S. I. (1976), *Engineering problems in areas of limestone springs*, *Pennsylvania Geology*, v. 7, no. 2, p. 6-9.

295. BOILING SPRING *(continued)*





296. HUNTSDALE HATCHERY SPRINGS

COUNTY: Cumberland

TOWNSHIP: Penn

QUADRANGLE: Dickinson

LOCATION: In the village of Huntsdale, approximately 9 miles southwest of Carlisle. The Pennsylvania Fish Commission owns and uses these springs for its Huntsdale Hatchery.



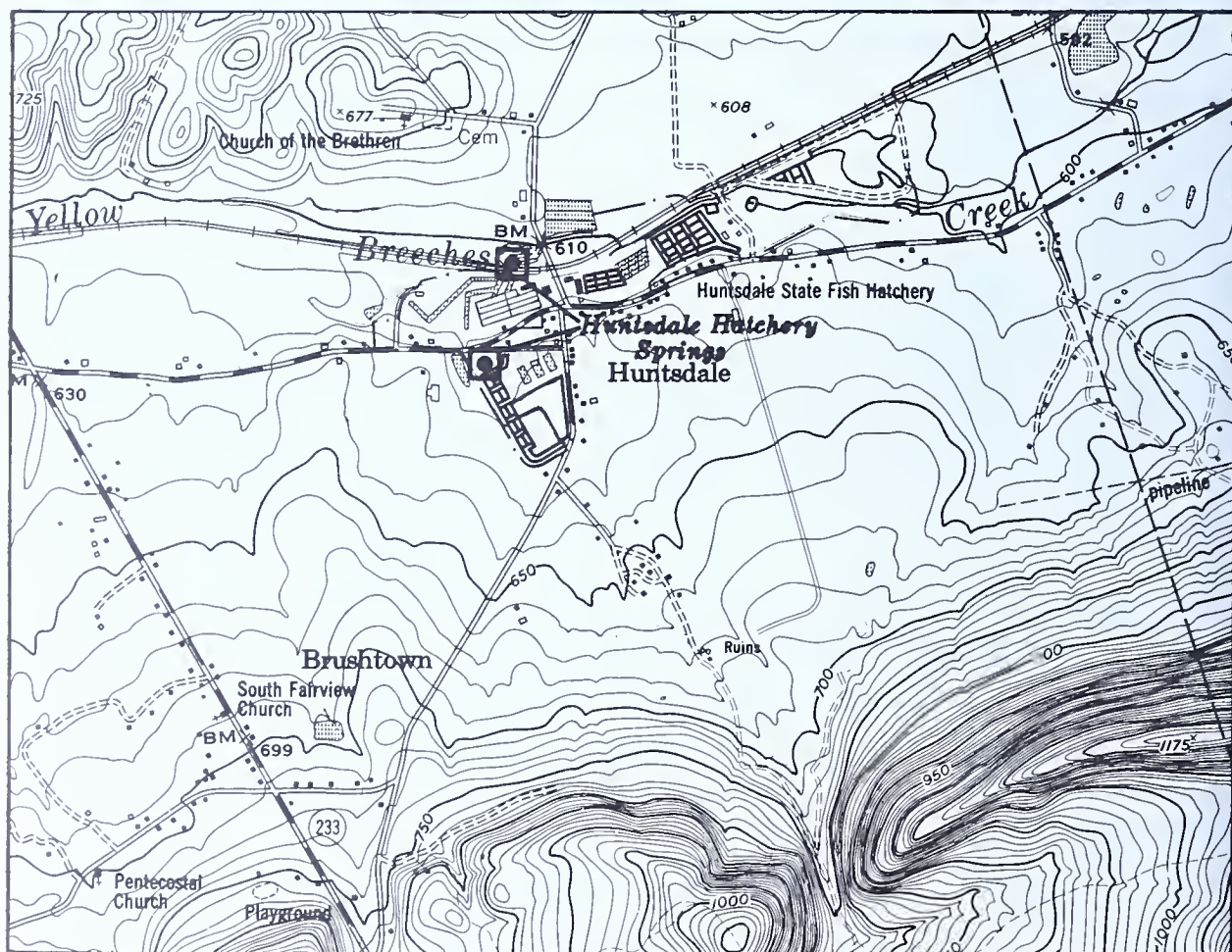
REMARKS:

A group of three springs is the sixth largest in the Commonwealth, having a combined median flow of 12,000 gallons per minute. The springs issue from fractures in the Tomstown Dolomite (Cambrian age). The origin of the springs is probably due to a combination of rock composition and fracturing (both jointing and faulting).

REFERENCE:

Flippo, H. N., Jr. (1974), *Springs of Pennsylvania*, Department of Environmental Resources, Office of Resources Management, Water Resources Bulletin 10, 46 p.

296. HUNTSDALE HATCHERY SPRINGS (continued)



VALLEY AND RIDGE PROVINCE

GREAT VALLEY SECTION

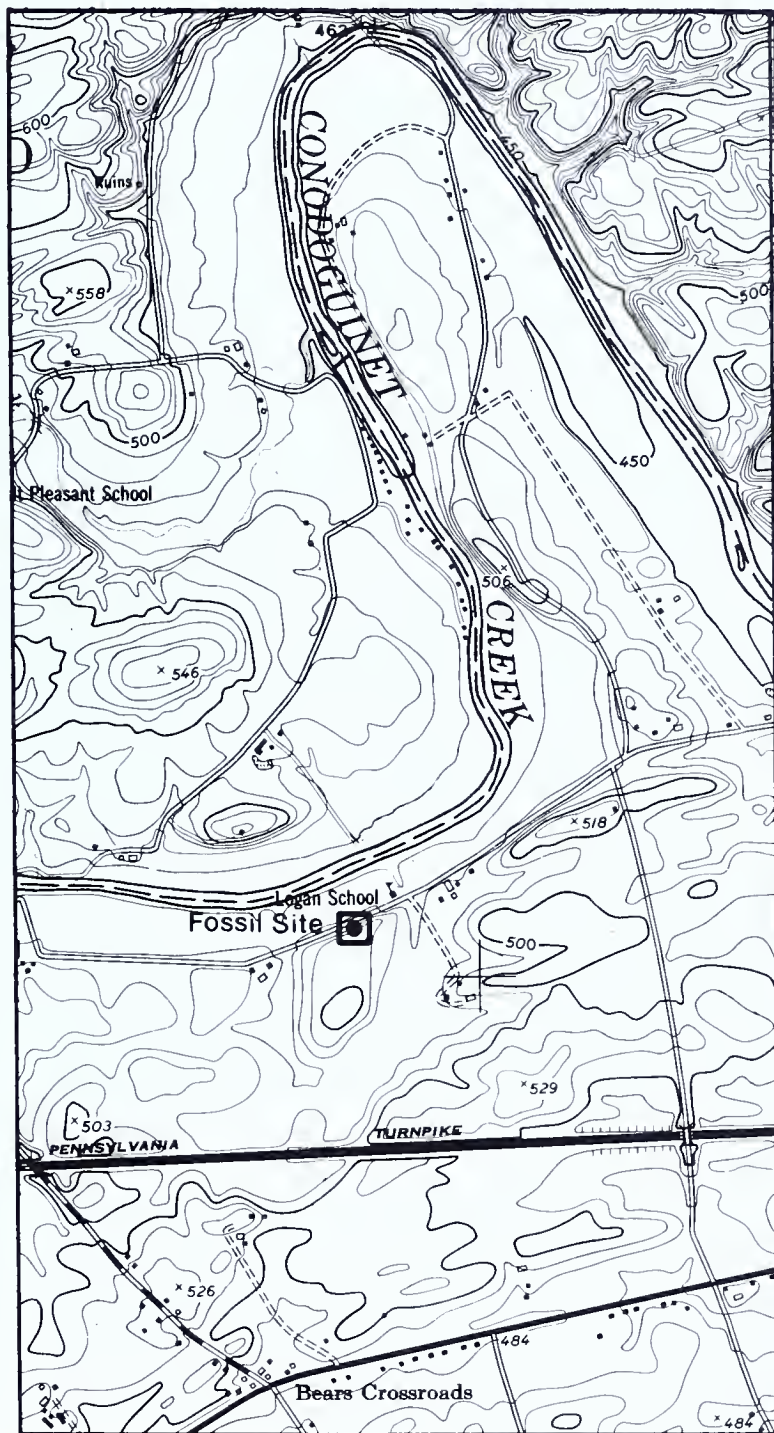


297. LOGAN SCHOOL FOSSIL SITE

COUNTY: Cumberland

TOWNSHIP: West Pennsboro

QUADRANGLE: Plainfield



LOCATION: North of the Pennsylvania Turnpike at Logan School; PRIVATE PROPERTY, NO TRESPASSING.

REMARKS: Abundant fossils occur in a Middle Ordovician limestone (Chambersburg Formation). This is one of the best fossil areas in this type of rock in Pennsylvania.

297. LOGAN SCHOOL FOSSIL SITE *(continued)*





298. RESERVOIR PARK OVERLOOK

COUNTY: Dauphin

CITY: Harrisburg

QUADRANGLE: Harrisburg East

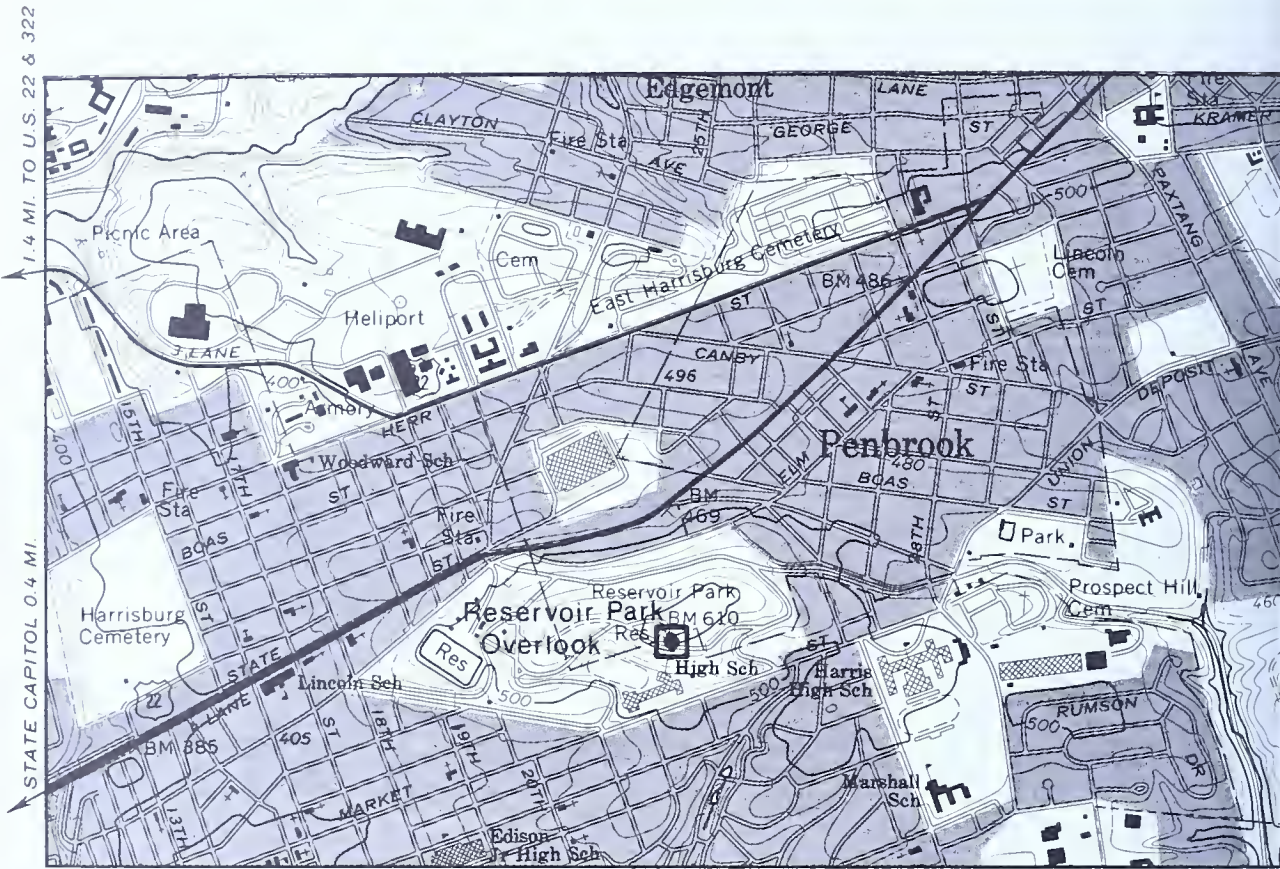
LOCATION: A park in the northeast section of the city.

REMARKS: The most outstanding site in Pennsylvania from which to view the Susquehanna Water Gap in Blue Mountain and the different erosion levels of the Appalachian Mountains, commonly thought to be peneplain surfaces. The peneplain concept is a major geologic controversy. The Schooley (Cretaceous) Peneplain is believed to be represented by the relatively even-crested tops of the mountains at 1400 to 1600 feet in elevation. The Harrisburg (late Tertiary) Peneplain is developed in the Ordovician shales and limestones, largely the Martinsburg Formation, at about 600 feet. The level near the present floodplain of the Susquehanna River and Conodoguinet Creek (about 320 to 350 feet) has been called the Summerville Peneplain. Some geologists have correlated the Harrisburg Peneplain with the Allegheny Peneplain (1250 feet) of western Pennsylvania and the Summerville with the Worthington (900 feet) of western Pennsylvania.

Reservoir Park is underlain by conglomerates in the Martinsburg Formation. This is an unusual occurrence, although sandstones are common.

REFERENCES: Ashley, G. H. (1933), *The scenery of Pennsylvania*, Pennsylvania Geological Survey, 4th ser., General Geology Report 6, 91 p.
Pittsburgh Geological Society (1955), *Field guidebook of Appalachian geology, Pittsburgh to New York*, American Association of Petroleum Geologists, Annual Meeting New York, New York, March 28-31, p. 45.

298. RESERVOIR PARK OVERLOOK (continued)





299. SPITZENBERG HILL

COUNTY: Berks

TOWNSHIP: Albany

QUADRANGLE: Kutztown

LOCATION: Six-tenths mile east of the village of Greenwald and Pa. Route 143; 1.7 miles north of the village of Klinesville and Interstate 78.

REMARKS: This small topographic hill has been the site of a raging geologic controversy for more than 40 years. The hill lies in the middle of the Martinsburg Shale (Ordovician age), but some geologists since 1934 have said that it is limestone conglomerate of Triassic age, a synclinal outlier of Triassic rocks. Today geologists have identified fossils (brachiopods and graptolites) that date the rocks as Late Ordovician; they are now thought to be part of the Juniata and Bald Eagle Formations.



299. SPITZENBERG HILL (continued)



REFERENCES:

- Platt, L. B., Loring, R. B., Papaspyros, Athanasios, and others (1972), *The Hamburg klippe reconsidered*, *American Journal of Science*, v. 272, p. 305-318.
- Whitcomb, Lawrence (1942), *Spitzenberg Conglomerate as a Triassic outlier in Pennsylvania*, *Geological Society of America Bulletin*, v. 53, p. 755-764.
- Whitcomb, Lawrence, and Engel, J. A. (1934), *The probable Triassic age of the Spitzenberg Conglomerate, Berks County, Pennsylvania*, *Pennsylvania Academy of Science Proceedings*, v. 8, p. 37-43.



300. SWATARA GAP FOSSIL SITE

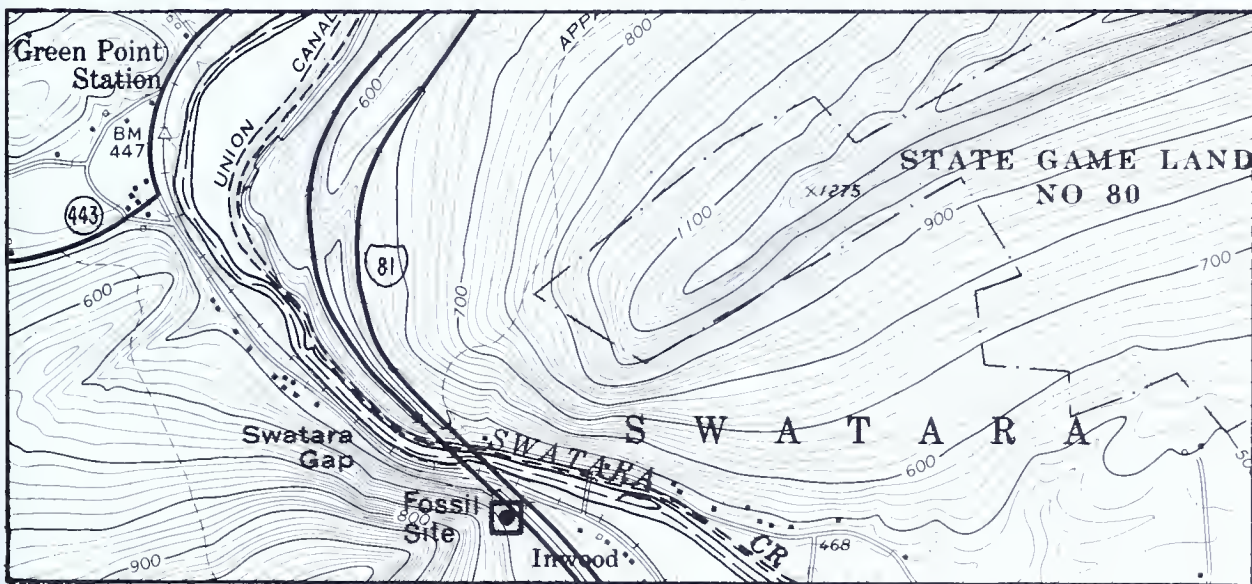
COUNTY: Lebanon

TOWNSHIP: Union

QUADRANGLE: Indiantown Gap

LOCATION: One mile north of Lickdale at Swatara Gap in Blue Mountain; on the west side of Swatara Creek directly beneath the Interstate 81 bridge over the creek.

REMARKS: An outcrop of Ordovician shale containing the largest abundance of the trilobite *Cryptolithus* in Pennsylvania; also contains excellent specimens of the rare Ordovician starfish *Hallaster*.



REFERENCES: Hoskins, D. M. (1969), *Fossil collecting in Pennsylvania*, Pennsylvania Geological Survey, 4th ser., General Geology Report 40, 2nd printing, revised, 126 p.

Cramer, H. R. (1957), *Ordovician starfish from the Martinsburg Shale, Swatara Gap, Pennsylvania*, *Journal of Paleontology*, v. 31, p. 903-907.

301. WILLIAMS QUARRY

COUNTY: Northampton

TOWNSHIP: Easton

QUADRANGLE: Easton

LOCATION: One and three-tenths miles north of the intersection of U. S. Route 22 and Pa. Route 611. Permission to enter is necessary.

REMARKS: One of the best known and most collected mineral areas in the state; a wide variety of minerals is found. Much of the limestone has been recrystallized into marble; the age of the major period of mineralization is Precambrian.

REFERENCES:

Geyer, A. R.,
Smith, R. C.,
II, and
Barnes, J. H.
(1976), *Mineral collecting in Pennsylvania*, 4th ed., Pennsylvania Geological Survey, 4th ser., General Geology Report 33, 260 p.

Montgomery, Arthur
(1957), *Three occurrences of high-thorian uraninite near Easton, Pennsylvania*, American Mineralogist, v. 42, p. 804-820.



VALLEY AND RIDGE PROVINCE

GREAT VALLEY SECTION



Montgomery, Arthur (1975), *Pennsylvania minerals (Post-script)*, Mineralogical Society of Pennsylvania, Keystone Newsletter, v. 24, no. 5, p. 8-9.

——— (1975), *Pennsylvania minerals (Second post-script)*, Mineralogical Society of Pennsylvania, Keystone Newsletter, v. 24, no. 6, p. 7.

Peck, F. B. (1911), *Preliminary report on the talc and serpentine of Northampton County and the portland cement materials of the Lehigh district*, Pennsylvania Geological Survey, 3rd ser., Report 5, 65 p.



BLUE RIDGE PROVINCE — SOUTH MOUNTAIN SECTION

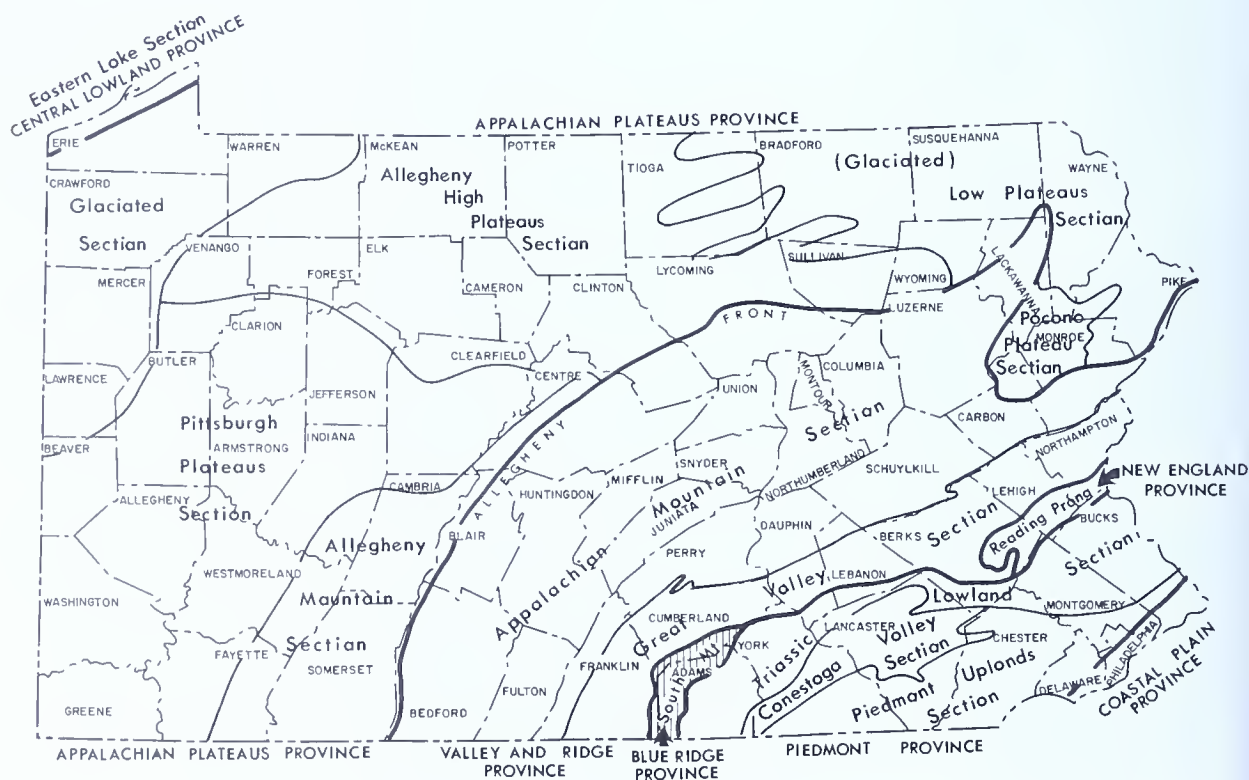
TOPOGRAPHY

The Blue Ridge province is bounded on the west by the Great Valley section of the Valley and Ridge province and on the east primarily by the Triassic Lowland section of the Piedmont province.

Mountaintop elevations range from 1500 feet above sea level near Mt. Holly Springs to 2100 feet atop Big Pine Flat Ridge north of Caledonia Park. The lowest elevation is 675 feet, and the maximum relief is about 1425 feet.

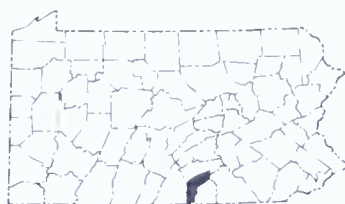
A series of northeast-trending ridges of South Mountain dominates the topography. Individual ridges are separated by narrow valleys. Because many of the ridges have almost flat-topped summits and concordant summit levels, they form a broad, moderately dissected upland surface.

Slopes average 8 to 15 degrees, but slopes of 20 to 30 degrees are not uncommon along the flanks of the deep, V-shaped stream valleys.



BLUE RIDGE PROVINCE

SOUTH MOUNTAIN SECTION



Stream gradients vary widely throughout the area. Gradients of 300 to 400 feet per mile are typical of the mountain streams, whereas gradients of 100 to 170 feet per mile are common elsewhere.

ROCK COLUMN

The Catoctin Formation is a thick sequence of volcanic rocks, rhyolites, and basalts. A thick section of clastic rocks overlies the volcanic rocks. These rocks, called the Chilhowee Group, include the Loudoun Formation, Weverton Quartzite, Harpers Formation, and Antietam Quartzite. This group is assigned an Early Cambrian age because its upper part (Antietam Quartzite) contains Lower Cambrian fossils. A description of the rocks follows:

SYSTEM	ROCK UNIT	DESCRIPTION
Cambrian	Waynesboro Formation	Buff dolomite; dark-blue limestone; dark-red to purple, sandy shale and siltstone; and subordinate light-colored sandstone.
	Tomstown Formation	Dolomite and dolomitic limestone.
	Chilhowee Group	
	Antietam Quartzite	White to gray, medium- to coarse-grained sandstone and quartzite.
	Harpers Formation	Greenish-gray fine-grained quartzose graywacke, sandstone, and quartzite.
	Montalto Quartzite Member	
Precambrian	Weverton Quartzite	Interbedded series of gray-green and purplish sandstone and quartzose graywacke.
	Loudoun Formation	Conglomerate member is grayish-green graywacke and a quartz-phyllite-rhyolite-pebble conglomerate. Phyllite member is predominantly reddish purple and has greenish or white blebs or streaks.
	Catoctin Formation	
	Metarhyolite	Blue, red, and gray, fine-grained metarhyolite. Red to lavender, porphyritic metarhyolite containing phenocrysts of quartz and feldspar.
	Metabasalt	Fine grained, usually greenish gray.
	Greenstone	Greenish-gray fine-grained porphyritic metabasalt and epidosite, undifferentiated.
	Epidosite	Fine to medium grained, granular, yellow green, contains a few amygdaloidal zones.
	Phyllite	Light greenish to green gray.
	Metarhyolite breccia	Breccia composed of gray metarhyolite fragments in a reddish matrix.

ROCK STRUCTURE

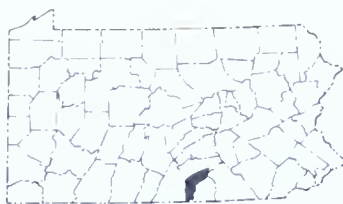
South Mountain is a large asymmetrical overturned anticline (anticlinorium). Its axis dips to the southeast and its crest is the western slope of South Mountain.

Although the anticlinorium is the dominant structure, faulting is common.

The larger faults are generally steep dipping, related to the stretching and overturning of the fold limbs.



BLUE RIDGE PROVINCE
SOUTH MOUNTAIN SECTION



302. BARE ROCK

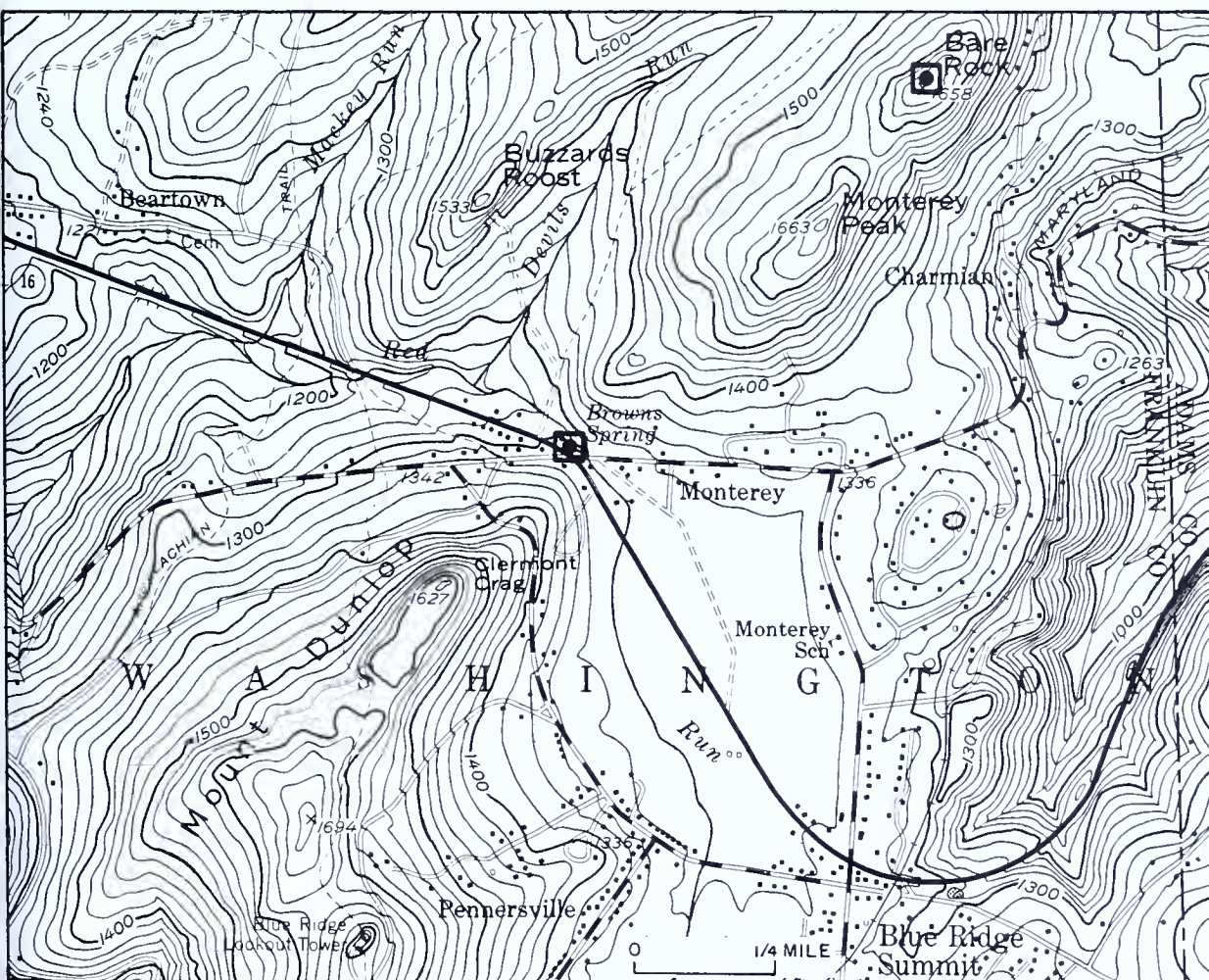
COUNTY: Franklin

TOWNSHIP: Washington

QUADRANGLE: Blue Ridge Summit

LOCATION: One and one-half miles north of the village of Blue Ridge Summit; 2.0 miles north of the Pennsylvania-Maryland boundary (Mason and Dixon Line).

REMARKS: Large, highly visible outcrops of light-gray quartzite (Weverton Formation, Early Cambrian age) near the summit give this feature its name. **Browns Spring** (303) is at the base of the mountain.



302. **BARE ROCK** (*continued*)



BROWNS SPRING

BLUE RIDGE PROVINCE
SOUTH MOUNTAIN SECTION



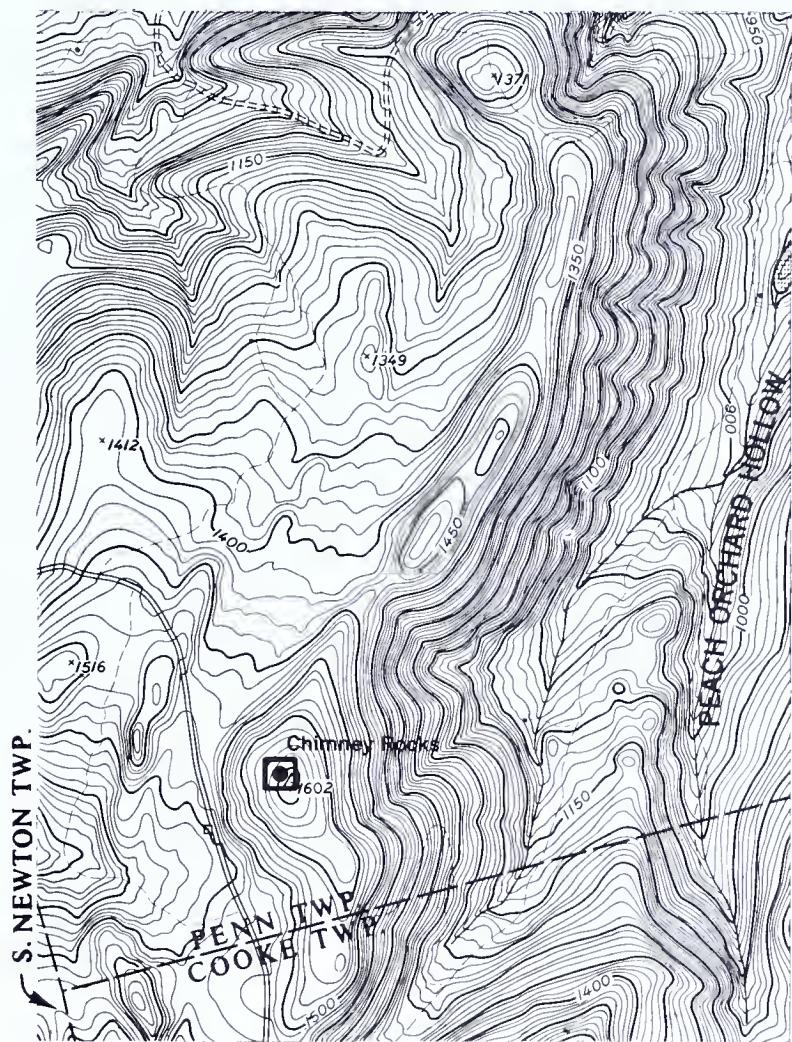
304. CHIMNEY ROCKS

COUNTY: Cumberland TOWNSHIP: Penn

QUADRANGLE: Dickinson

LOCATION: In the southwestern corner of the township, approximately 4 miles north of the Cumberland-Adams County line and Pa. Route 233.

REMARKS: A spire of quartzite (Antietam Formation, Cambrian age) in the shape of a chimney rises above the surrounding ridge line. The name of this topographic feature is also the name of a first-order U. S. Geological Survey triangulation station and bronze marker at this site.



305. COLUMNAR JOINTED VOLCANICS

COUNTY: Adams

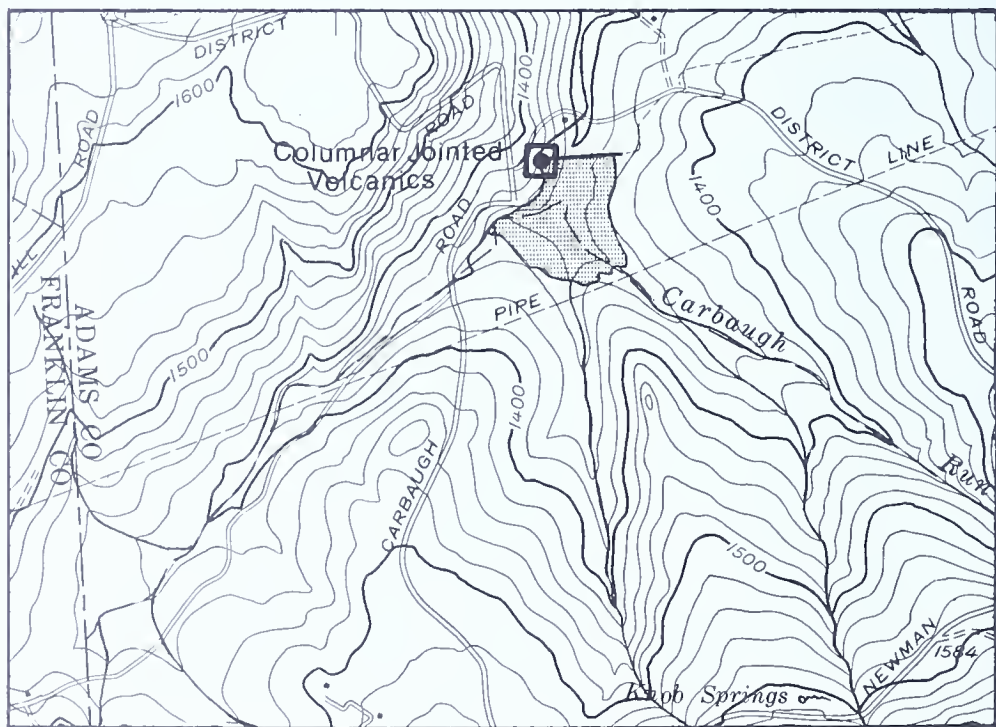
TOWNSHIP: Franklin

QUADRANGLE: Iron Springs

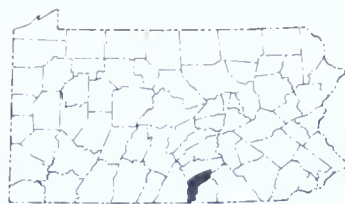
LOCATION: About 2.5 miles northeast of the village of South Mountain.

REMARKS: Well-preserved columnar joints in the Catoctin metarhyolite (Precambrian age) are exposed along the west wall of the dam and spillway. The reservoir serves as a water supply for the hospital at South Mountain. Unique columnar structures exposed here are about 20 feet high and as much as 2 feet wide, and have hexagonal and pentagonal sides. Tree cover behind the spillway wall is sufficiently thick during the summer months to completely hide this feature.

REFERENCE: Pennsylvania Geology (1969), *Columnar jointing in South Mountain*, v. 1, no. 2, p. 7.



BLUE RIDGE PROVINCE
SOUTH MOUNTAIN SECTION



NOTES:

306. DEVILS RACECOURSE

COUNTY: Franklin

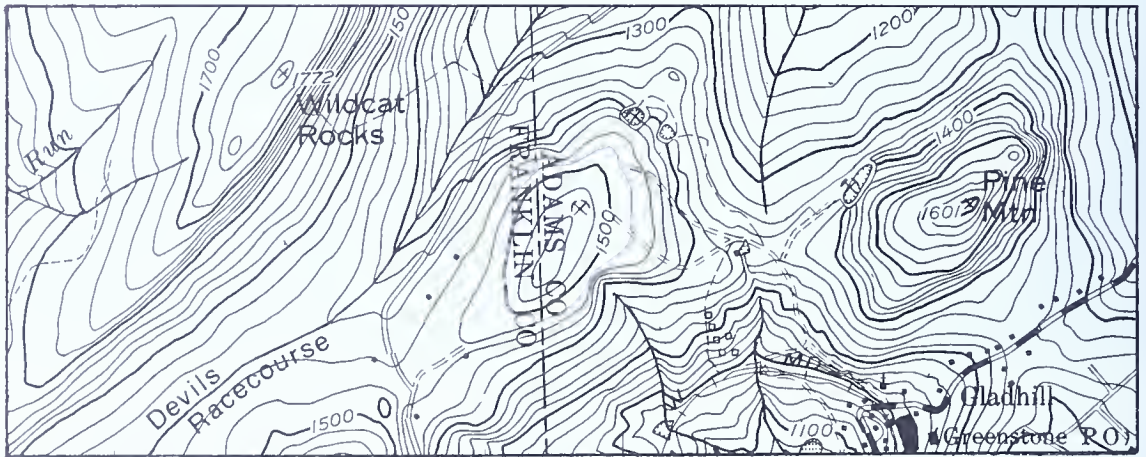
TOWNSHIP: Washington

QUADRANGLE: Iron Springs

LOCATION: About 1 mile west of Gladhill (Adams County);
in South Mountain.

REMARKS: A boulder field composed of Weverton sand-
stone (Cambrian age) boulders stripped of soil.

REFERENCE: Stose, G. W., and Bascom, F. (1929), *Fairfield-
Gettysburg, Pennsylvania*, U. S. Geological
Survey Atlas, Folio 225, 22 p.



NOTES:

BLUE RIDGE PROVINCE

SOUTH MOUNTAIN SECTION



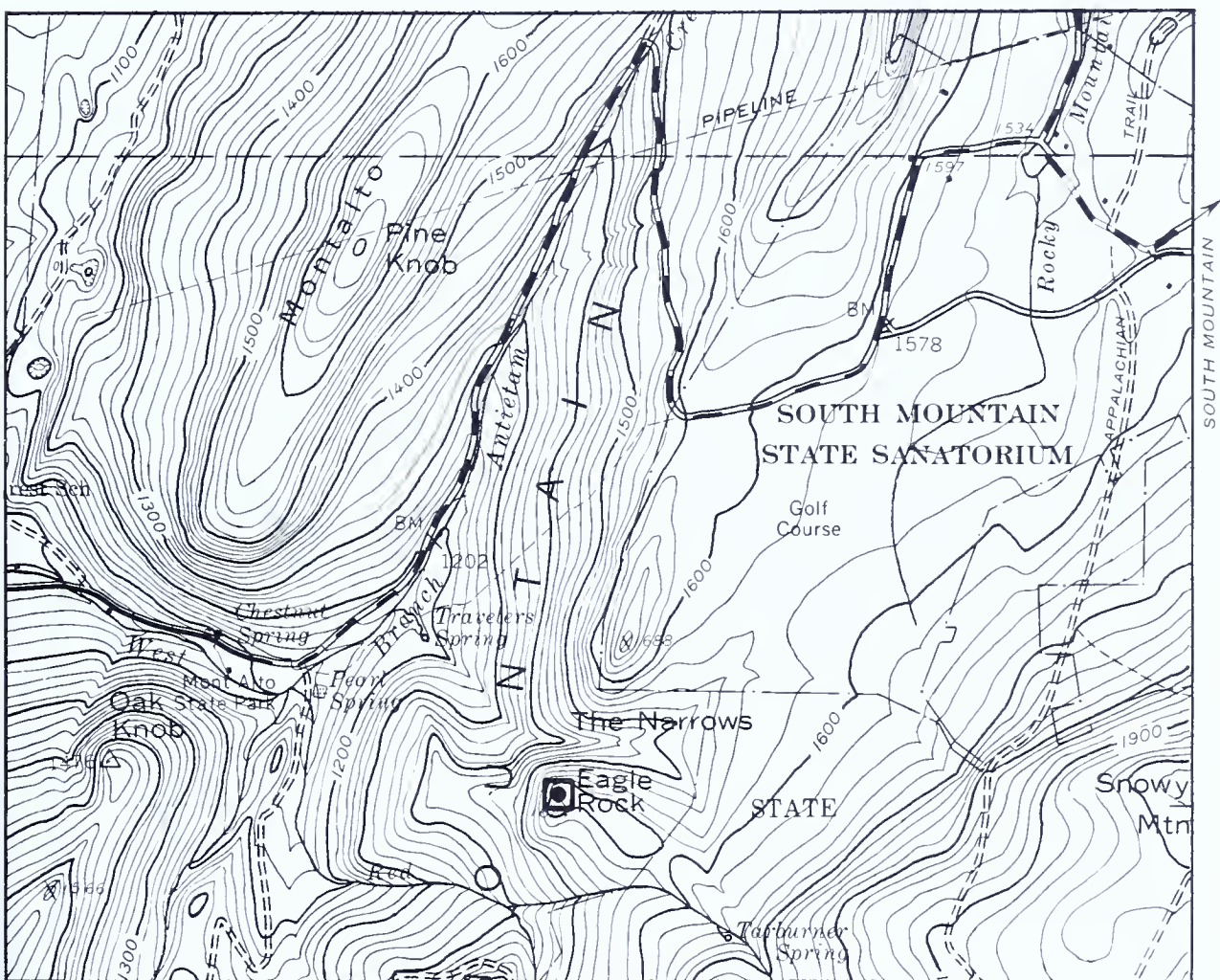
307. EAGLE ROCK

COUNTY: Franklin

TOWNSHIP: Greene

QUADRANGLE: Scotland

LOCATION: On the west rim of South Mountain, about 3.5 miles southeast of the village of Scotland.



REMARKS:

Weathered outcrops of moderately dipping quartzite (Antietam Formation, Lower Cambrian age) form **Eagle Rock**. This west rim of South Mountain and discontinuous ridges and knobs are part of a broad symmetric arch (anticline) in this corner of Franklin County.

REFERENCE:

Fauth, J. L. (1968), *Geology of the Caledonia Park quadrangle area, South Mountain, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Atlas 129a, p. 116.

308. HAMMONDS ROCKS

COUNTY: Cumberland

TOWNSHIP: Dickinson

QUADRANGLE: Mount Holly Springs

LOCATION: Four and four-tenths miles southwest of Mount Holly Springs on the crest of South Mountain.

REMARKS: A magnificent overlook and view of the Blue Ridge province. Outcrops of Weverton conglomerate (Cambrian age) show pebbles that have been elongated due to deformation.

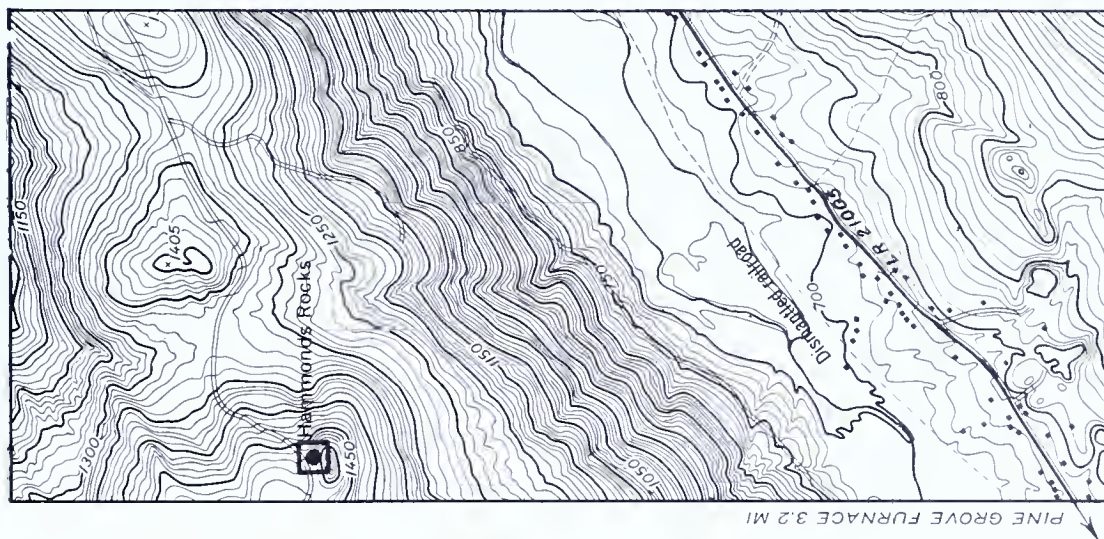
REFERENCE: Freedman, Jacob (1967), *Geology of a portion of the Mount Holly Springs quadrangle, Adams and Cumberland Counties, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Progress Report 169, 66 p.



BLUE RIDGE PROVINCE
SOUTH MOUNTAIN SECTION



HAMMONDS ROCKS



309. LEWIS ROCKS

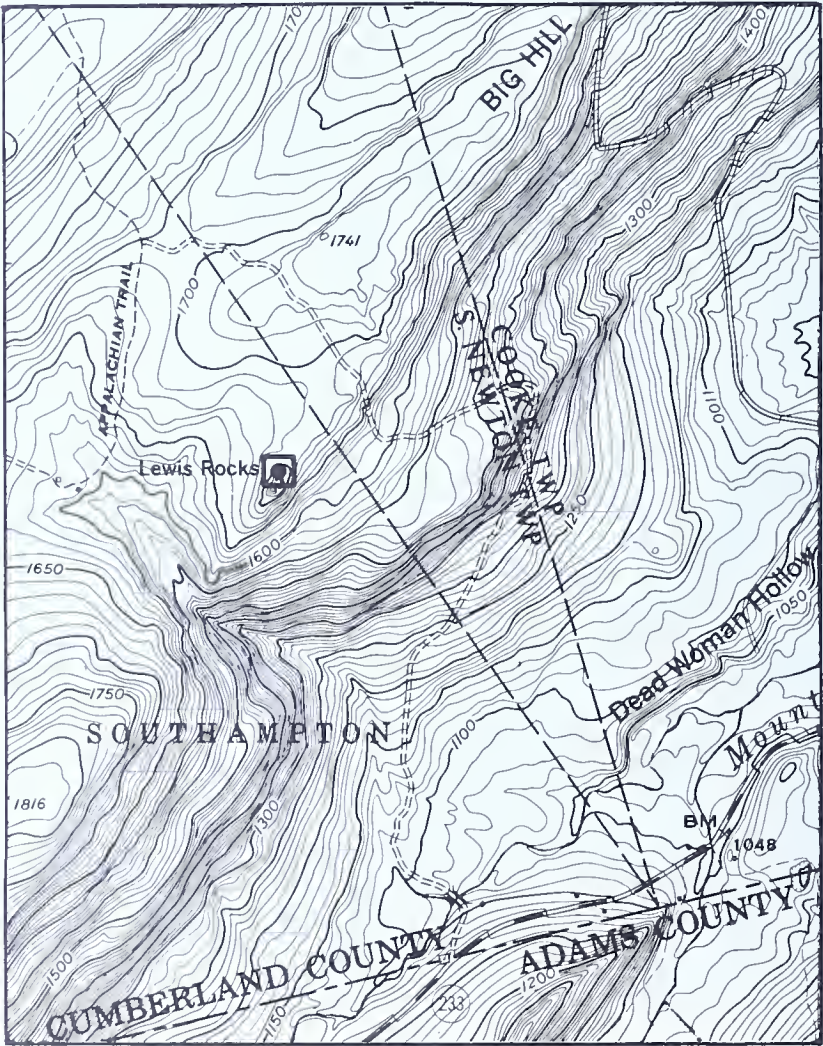
COUNTY: Cumberland

TOWNSHIP: Southampton

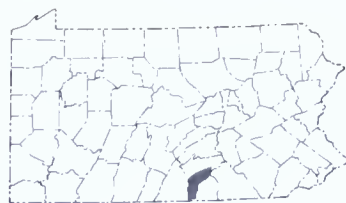
QUADRANGLE: Dickinson

LOCATION: Approximately 13 miles north of Caledonia and U. S. Route 30; on Big Hill in South Mountain; within Michaux State Forest.

REMARKS: Hard, tough, weather-resistant spires of quartzite (Weverton Formation, Lower Cambrian age) are spectacular at this site, which is near the Appalachian Trail.



BLUE RIDGE PROVINCE
SOUTH MOUNTAIN SECTION



310. MONUMENT ROCK

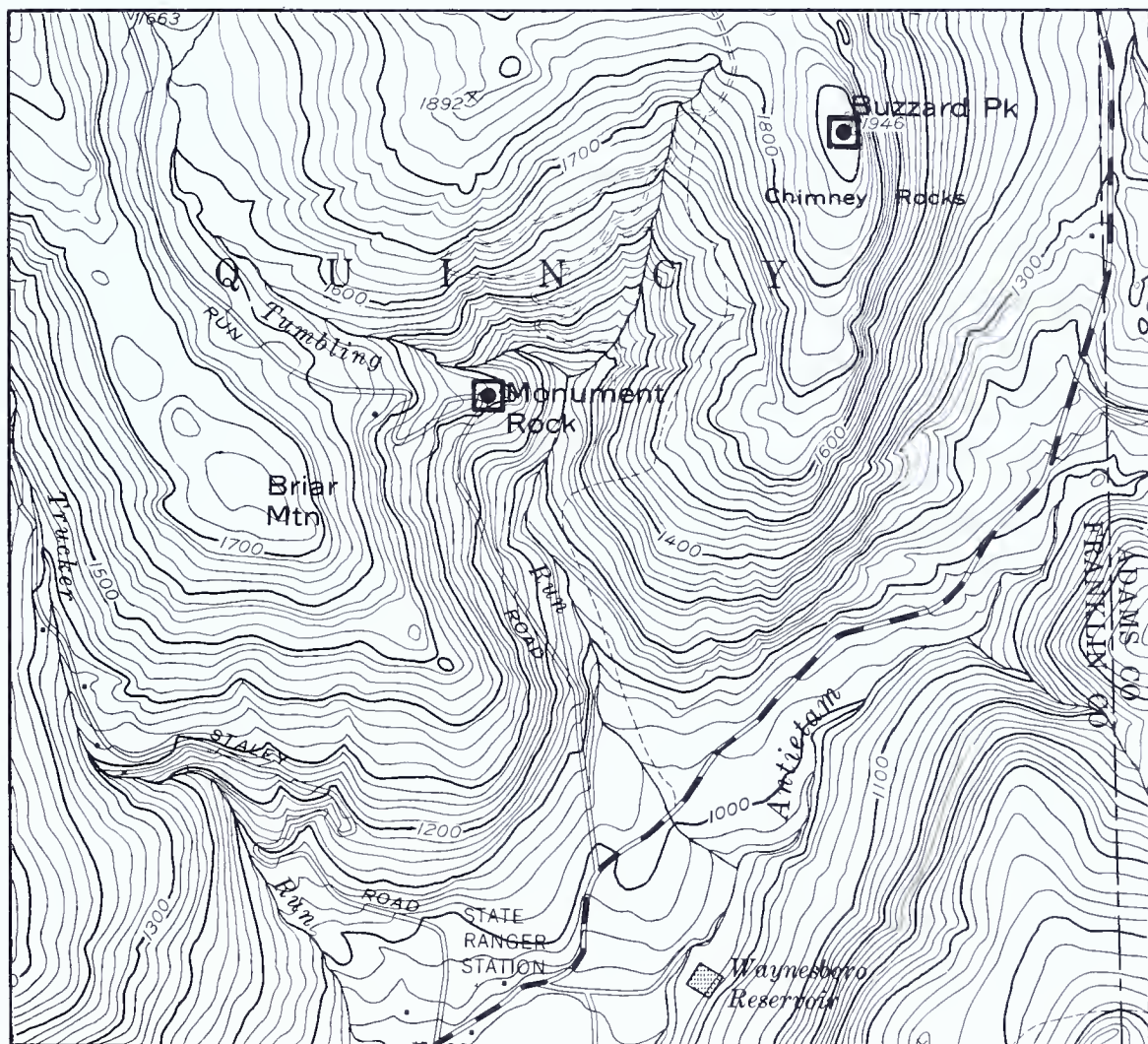
COUNTY: Franklin

TOWNSHIP: Quincy

QUADRANGLE: Iron Springs

LOCATION: Two and three-tenths miles south-southeast of the South Mountain Geriatric Center.

REMARKS: An outstanding overview from spectacular pinnacles of Weverton quartzite (Cambrian age). Stretched pebbles and crossbedding may be seen in the rocks, which are located approximately 650 feet from the road and Appalachian Trail. **Chimney Rocks** (311) and **Buzzard Peak** (312) are visible in the distance.



310. MONUMENT ROCK (*continued*)



BLUE RIDGE PROVINCE

SOUTH MOUNTAIN SECTION



313. STONE HEAD

COUNTY: York

TOWNSHIP: Franklin

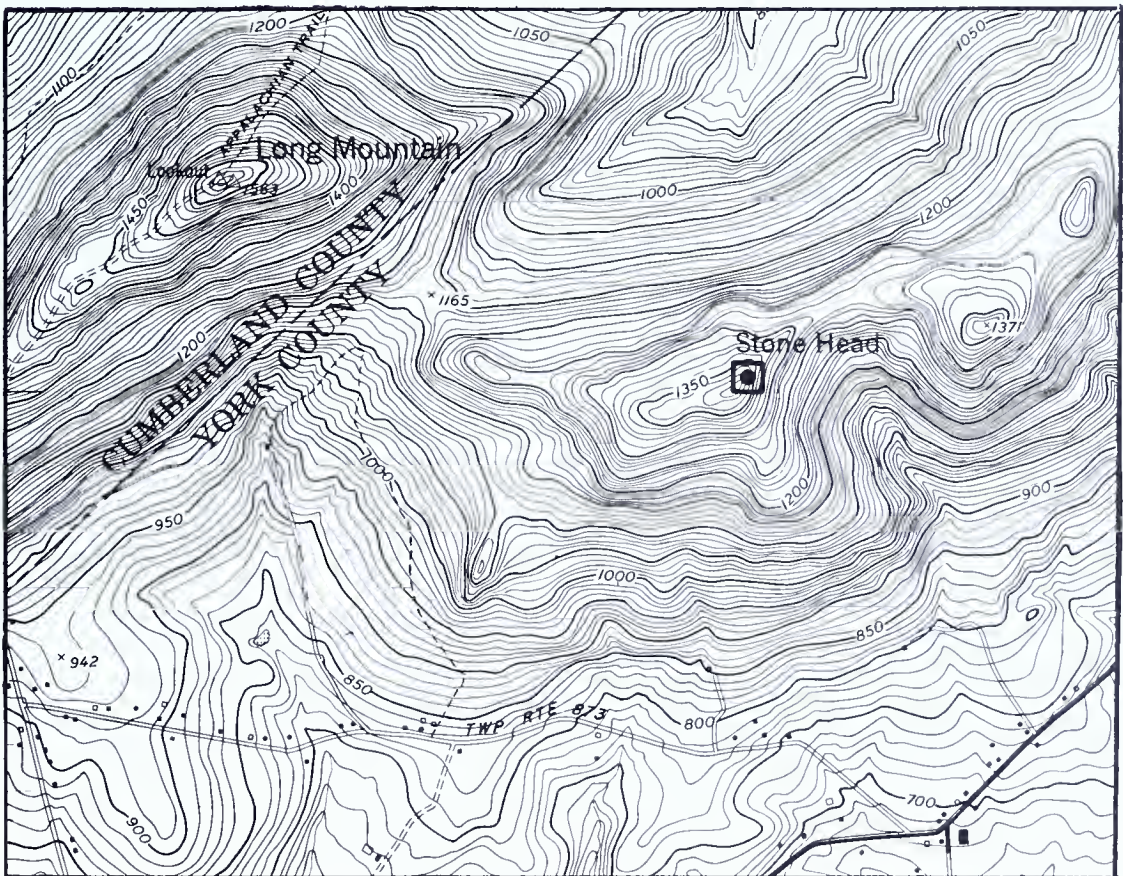
QUADRANGLE: Dillsburg

LOCATION: About 4 miles southwest of the Borough of Dillsburg; 2 miles northeast of the junction of York, Cumberland, and Adams Counties.



REMARKS:

An outcrop of quartzite of the Antietam Formation (Cambrian age) has weathered to a shape resembling a head. **Lookout** (314) on Long Mountain (Cumberland County, South Middleton Township) is a nearby similar outcrop (not similar in shape) along the Appalachian Trail.



315. THE NARROWS

COUNTY: Adams

TOWNSHIP: Franklin

QUADRANGLE: Arendtsville

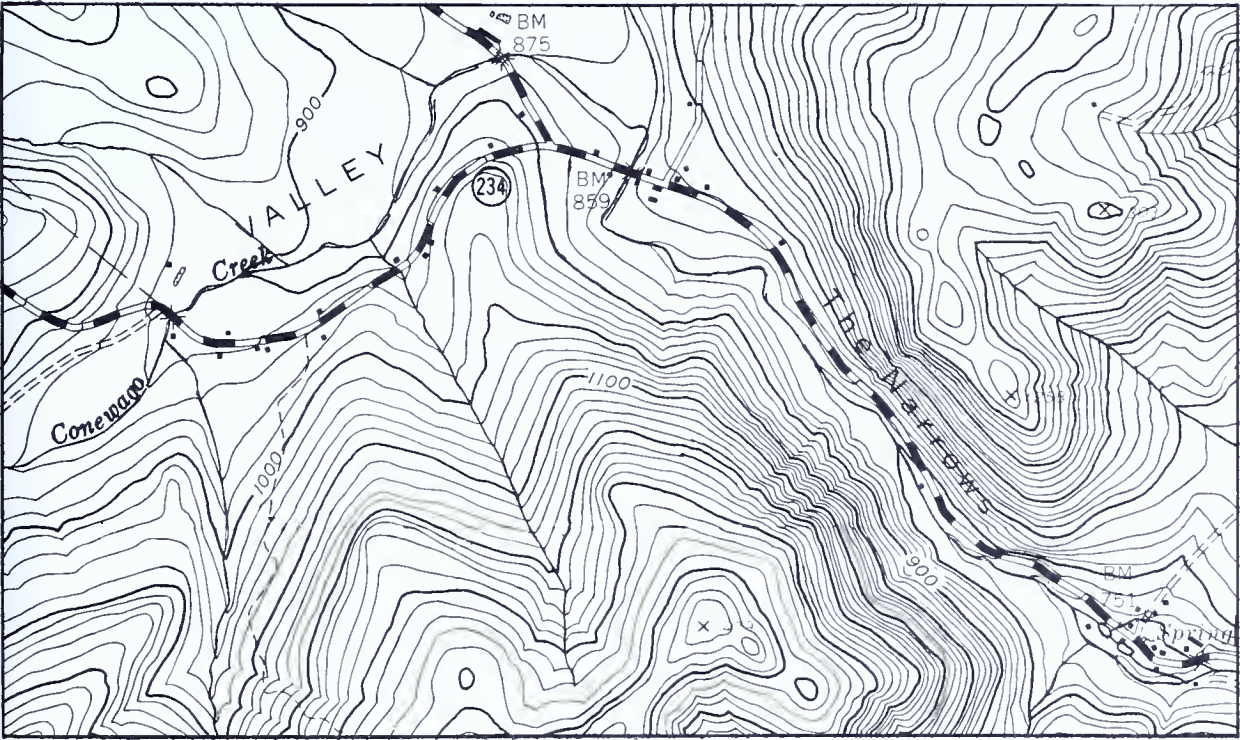
LOCATION: Two miles northwest of the Borough of Arendtsville.

REMARKS: A water gap formed by Conewago Creek; has a maximum relief of 680 feet. Large and numerous outcrops of gray-green metarhyolite (Precambrian age) dot the surface; note the flow structures and various sized porphyritic textures.

REFERENCE: Shirk, W. R. (1978), *The geology of south-central Pennsylvania*, Guidebook, National Association of Geology Teachers, Eastern Section, Shippensburg State College, Shippensburg, Pennsylvania, 73 p.



BLUE RIDGE PROVINCE
SOUTH MOUNTAIN SECTION



316. WHITE ROCKS

COUNTY: Cumberland

TOWNSHIP: Monroe

QUADRANGLE: Dillsburg

LOCATION: Three and eight-tenths miles west of Dillsburg on the north rim of South Mountain.

REMARKS: An excellent view across the Great Valley to Blue Mountain. This is a pinnacled ridge of quartzite of the Antietam Formation (Cambrian age) crossed at **Center Point Knob** (317) by the Appalachian Trail.



NOTES:

BLUE RIDGE PROVINCE
SOUTH MOUNTAIN SECTION



318. WHITE ROCKS

COUNTY: Franklin

TOWNSHIP: Guilford

QUADRANGLE: Waynesboro

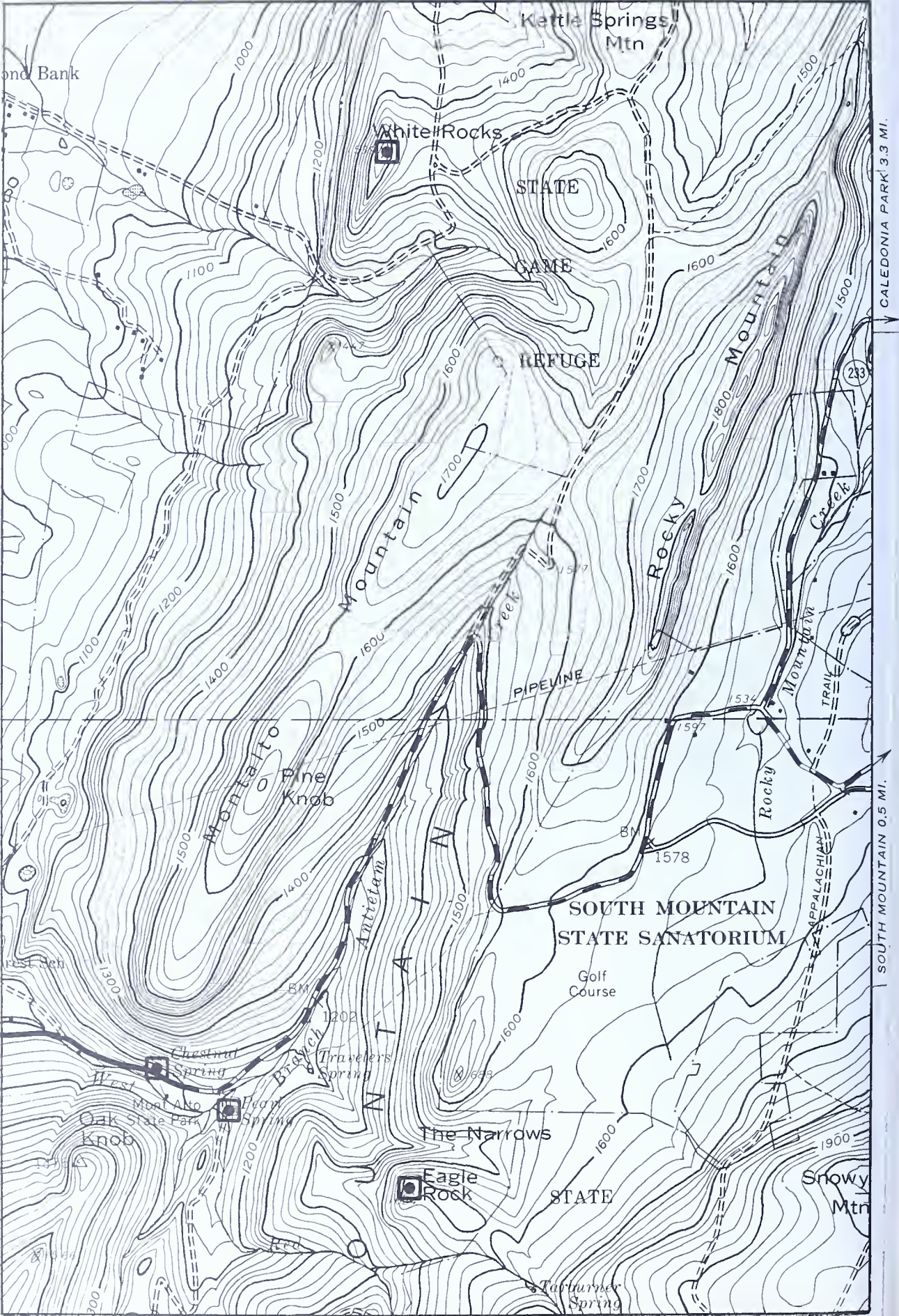
LOCATION: Within Mont Alto State Forest; 1.1 miles east of the village of Pond Bank.



REMARKS: Towering spires of white quartzite (Antietam Formation, Early Cambrian age) on the west face of Montalto Mountain are visible for miles. The almost vertical dip of the rocks, combined with a wide spacing of joint fractures, has resulted in huge, vertical columns of quartzite; through weathering, these columns have attained their present shapes. **Eagle Rock** (319) to the south is a similar geologic feature. Springs, such as **Chestnut Spring** (320) and **Pearl Spring** (321), are common at the base of the mountain.

REFERENCE: Root, S. I. (1968), *Geology and mineral resources of southeastern Franklin County, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Atlas 119cd, 118 p.

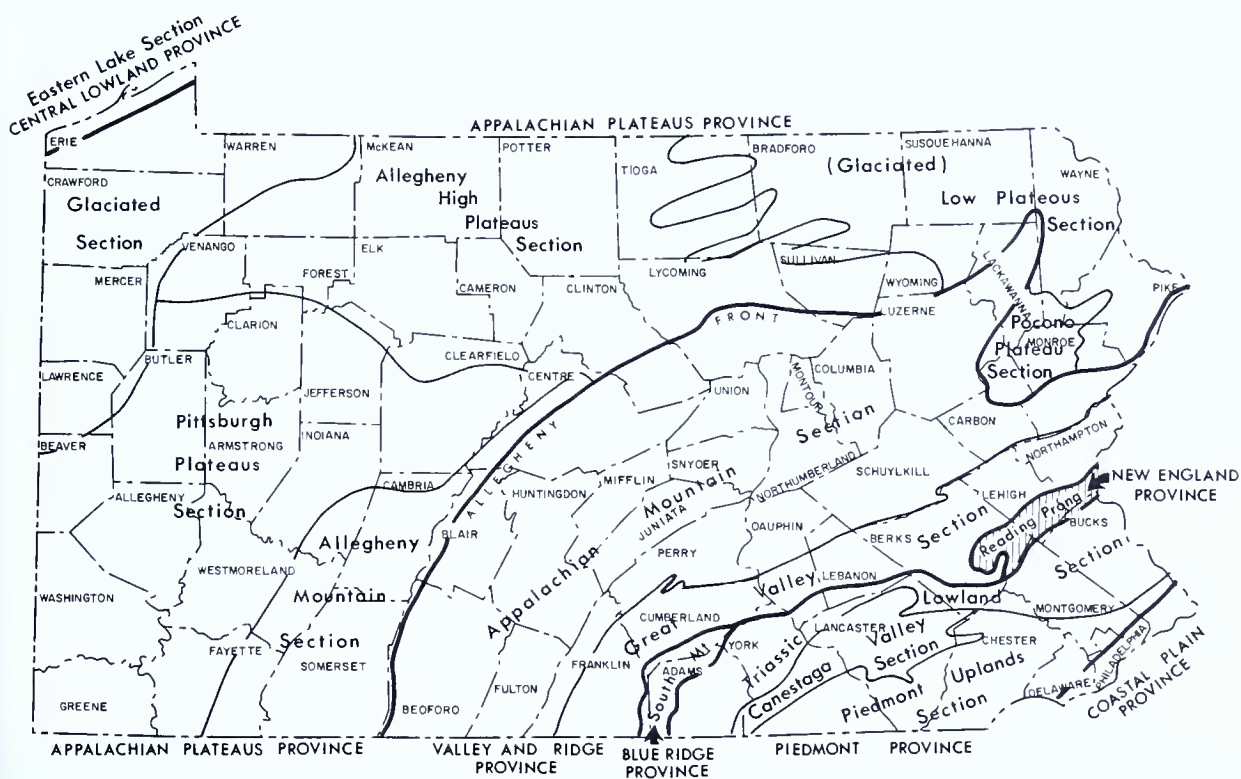
318. WHITE ROCKS (continued)



NEW ENGLAND PROVINCE— READING PRONG SECTION

TOPOGRAPHY

This region is a deeply dissected mountain range. The local relief is as great as 500 feet, and the ridge summits rise more than 800 feet above the Great Valley. The Reading Prong is represented by an east-west-trending belt of ridges that range from 6 to 8 miles in width and extend from the Delaware River to the Schuylkill River in the vicinity of Reading. South Mountain is the most prominent topographic feature.



ROCK COLUMN

The rocks of the Reading Prong are metamorphic and igneous and of Cambrian and Precambrian age. This highland is an extension of the crystalline rocks of New England across southeastern New York State and northern New Jersey into southeastern Pennsylvania.

SYSTEM	ROCK UNIT	DESCRIPTION
Cambrian	Hardyston Formation	Light-gray to white quartzite
Precambrian	Granitic gneiss	Light-pink; medium-grained texture; major minerals are quartz, microcline, hornblende, and occasional biotite; tends to weather into knobby, large rounded boulders, has been called "Byram" granite gneiss

OUTSTANDING SCENIC GEOLOGICAL FEATURES OF PENNSYLVANIA

SYSTEM	ROCK UNIT	DESCRIPTION
Precambrian	Quartz diorite gneiss	Dark-greenish-gray; includes granodiorite.
	Hornblende-pyroxene gneiss	Black hornblende gneiss; has been called "Pochuck" gneiss.
	Graphitic gneiss	Includes metasediments intermediate in composition between graphitic gneiss and hornblende-pyroxene gneiss; tends to weather into small slab-like pieces.
	Metadiabase	Dark-greenish-gray; tough, resistant to weathering; forms "ironstone" boulders.
	Franklin Marble	Medium-grained, white; contains up to 5 percent graphite flakes.
	Moravian Heights Formation	Quartz-sericite-sillimanite schist; light-gray; contains parallel streaks of sericite and sillimanite.

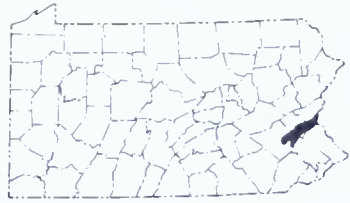
ROCK STRUCTURE

The outstanding structural features of the Reading Prong are large over-turned folds and thrust faults, which are the complex result of several episodes of folding and faulting related to two major mountain-building periods (Taconic and Alleghanian). The metamorphic and igneous rocks are rootless at many places due to this intense breaking up of the rocks.



NEW ENGLAND PROVINCE

READING PRONG SECTION



322. BAUER ROCK

COUNTY: Lehigh

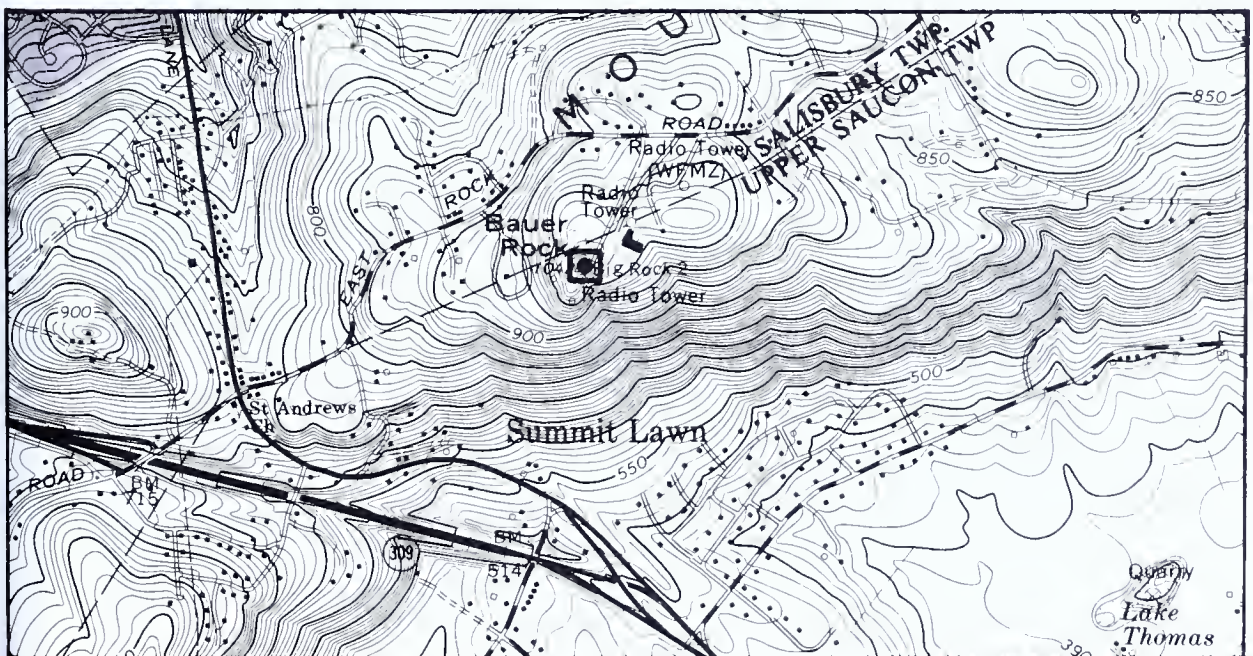
TOWNSHIP: Upper Saucon

QUADRANGLE: Allentown East

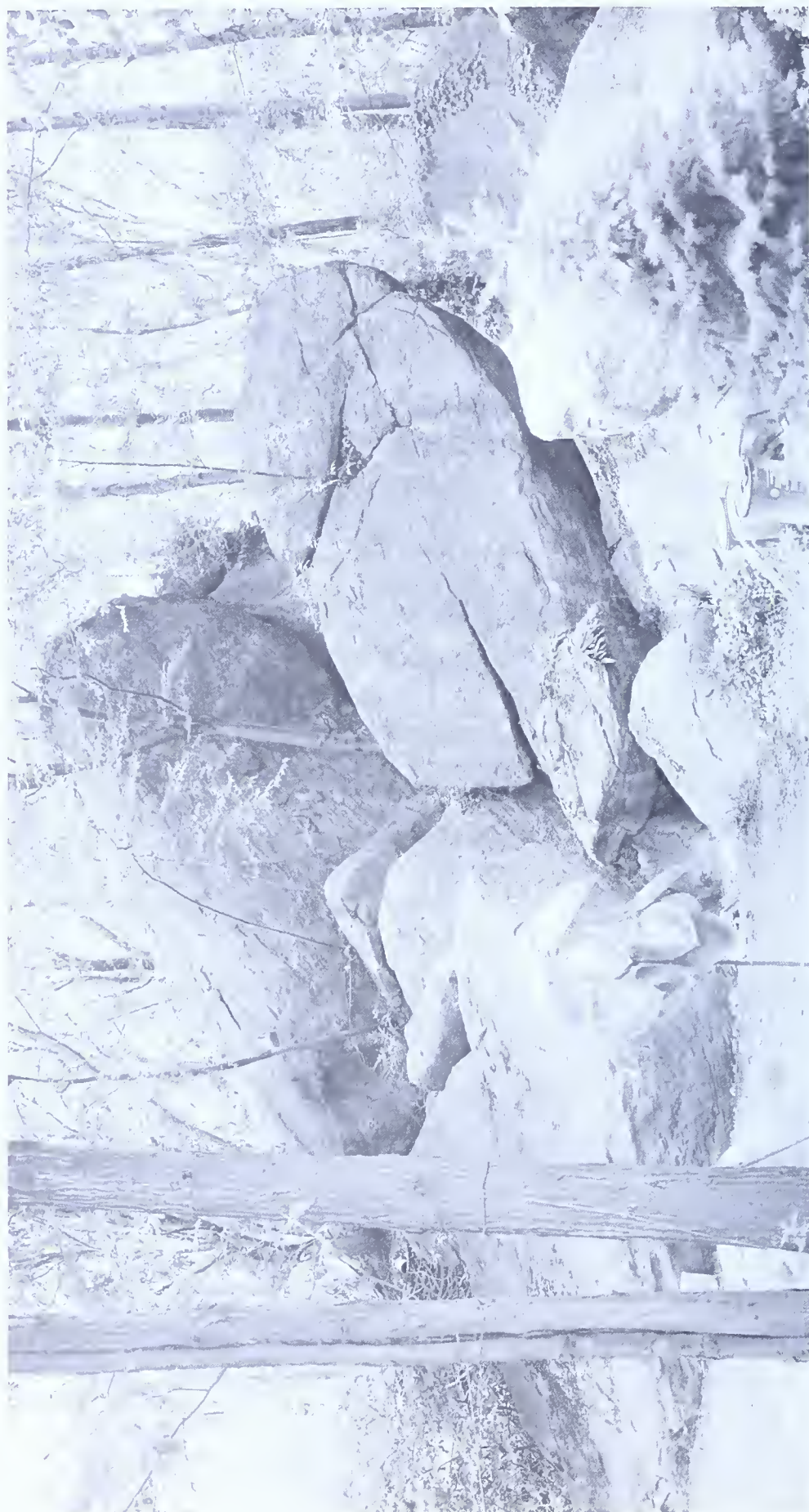
LOCATION: South of Allentown at the summit of South Mountain.

REMARKS: A mass of dark- and light-banded Pochuck gneiss (Precambrian age) rising about 40 feet above the ridge line; its top is about 1040 feet above sea level. A panoramic view of Saucon Valley to the north can be seen from the crest. The pinnacle is due to the fact that there are fewer joints and cracks in the gneiss at Bauer Rock than in the surrounding rock formations; Bauer Rock has not eroded away as quickly as the rest of the mountain because the presence of fewer joints impedes the weathering process on the gneiss.

REFERENCE: Miller, B. L., Fraser, D. M., Miller, R. L., and others (1941), *Lehigh County, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., County Report 39, 492 p.



322. **BAUER ROCK** *(continued)*



NEW ENGLAND PROVINCE

READING PRONG SECTION



323. CUSHION PEAK

COUNTY: Berks

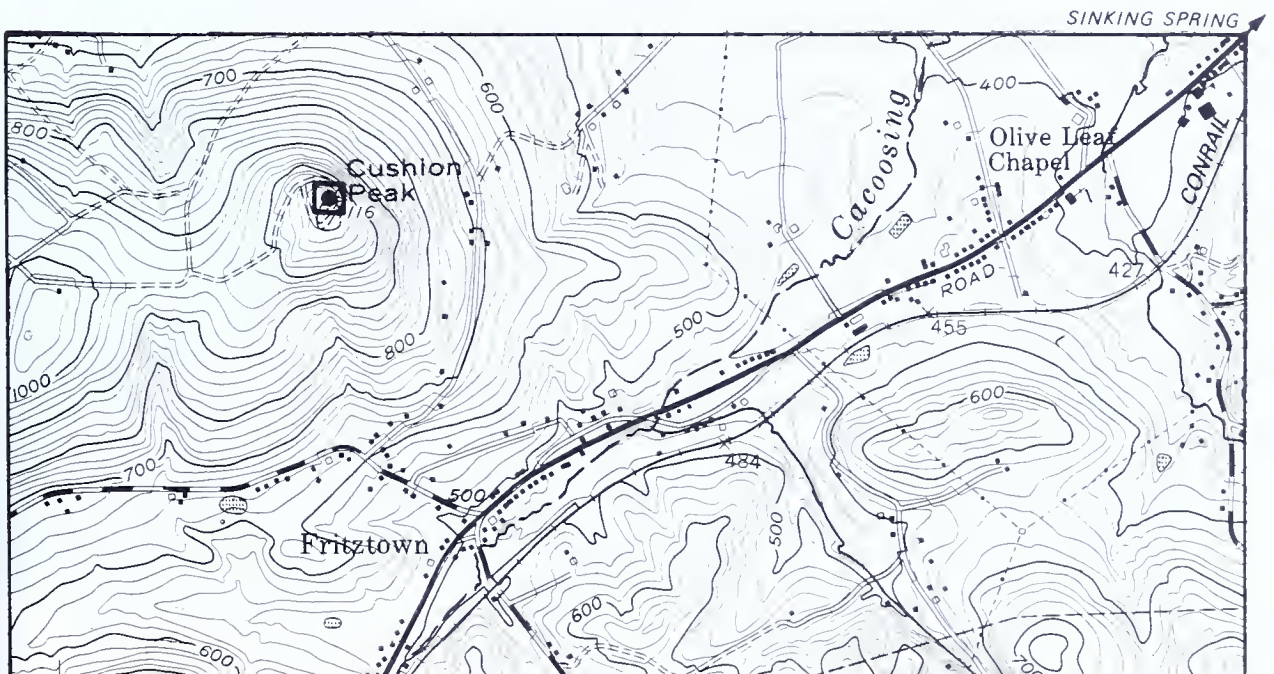
TOWNSHIP: South Heidelberg

QUADRANGLE: Sinking Spring

LOCATION: On the northern rim of South Mountain, 3.2 miles southwest of the Borough of Sinking Spring.

REMARKS: The Hardyston Quartzite (Cambrian age) has been thrust faulted over the limestone valley at this site. This "rootless slice" of Hardyston Quartzite contains an isolated peak, **Cushion Peak**, rising more than 800 feet above the Great Valley to the north; an excellent view of the Great Valley from the peak.

REFERENCE: MacLachlan, D. B., Buckwalter, T. V., and McLaughlin, D. B. (1975), *Geology and mineral resources of the Sinking Spring 7 1/2-minute quadrangle, Berks and Lancaster Counties, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Atlas 177d, 228 p.



323. CUSHION PEAK *(continued)*



NEW ENGLAND PROVINCE

READING PRONG SECTION



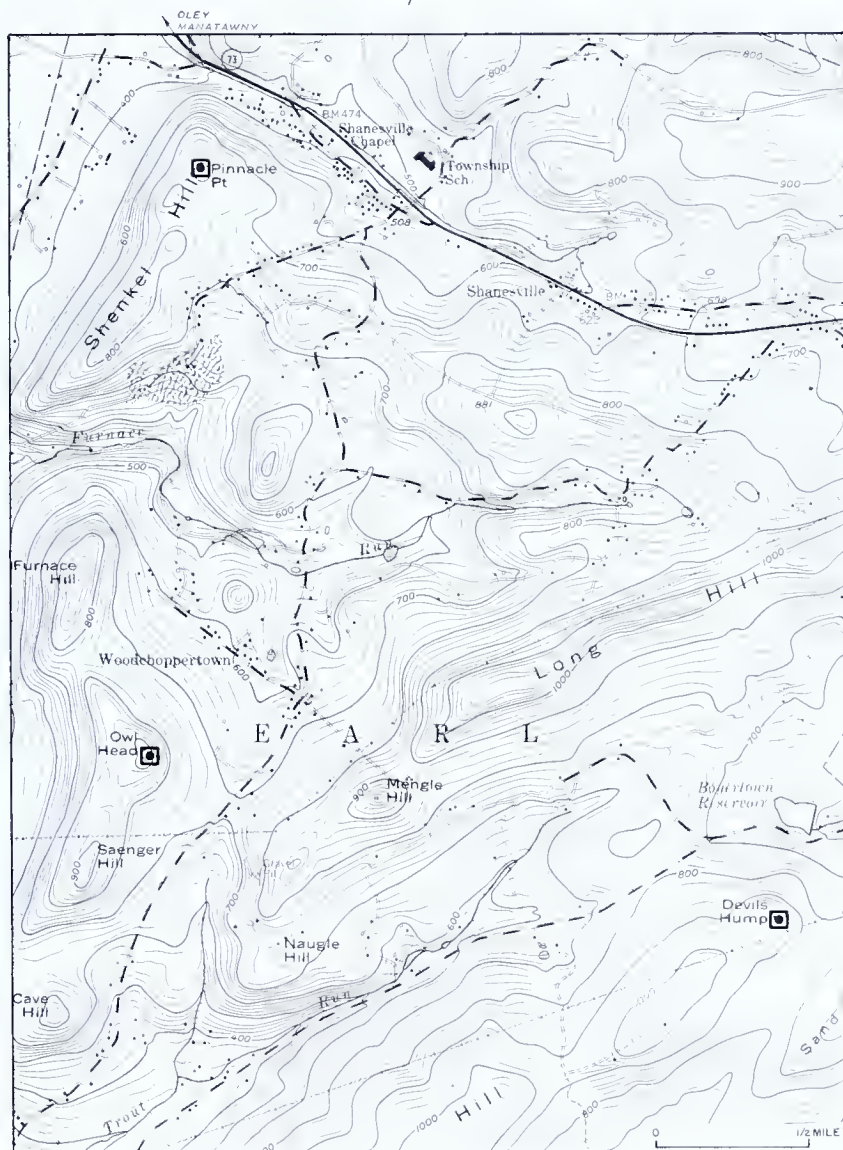
324. DEVILS HUMPH

COUNTY: Berks

TOWNSHIP: Earl

QUADRANGLE: Boyertown

LOCATION: Two and two-tenths miles west of Boyertown on Fancy Hill.



REMARKS:

A basal conglomerate in the Hardyston Quartzite (Cambrian age) is so extremely hard and resistant to weathering that individual peaks stand topographically above the surrounding granite gneiss (Precambrian age); **Devils Hump**, **Owl Head** (325), and **Pinnacle Point** (326) are three of the highest.

REFERENCE:

Buckwalter, T. V. (1959), *Pre-Cambrian geology, Boyertown quadrangle*, Pennsylvania Geological Survey, 4th ser., Atlas 197, 15 p

327. EAGLE PEAK

COUNTY: Lebanon

TOWNSHIP: Millcreek

QUADRANGLE: Womelsdorf

LOCATION: Approximately 0.3 mile west of the Lebanon-Berks County line; 1.7 miles southeast of the village of Newmanstown; about 2000 feet northeast of South Sheridan Road.

REMARKS: The hard, resistant quartzite and conglomerate of the Hardyston Formation (Cambrian age) underlie this feature and account for its high relief (1300 feet above sea level). Numerous exposures of quartzite on the summit have weathered into various shapes.



NEW ENGLAND PROVINCE
READING PRONG SECTION



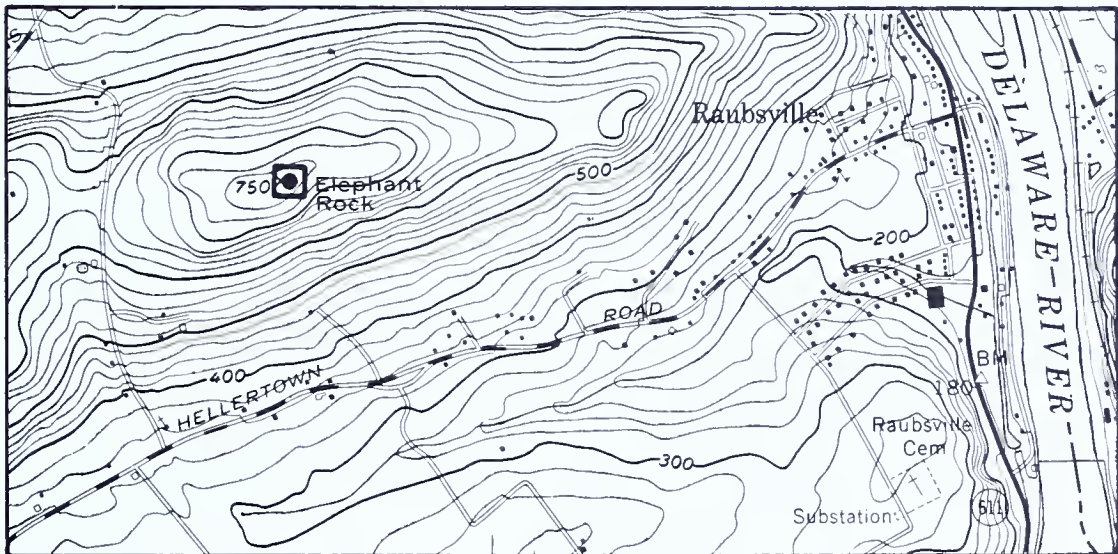
328. ELEPHANT ROCK

COUNTY: Northampton

TOWNSHIP: Williams

QUADRANGLE: Easton

LOCATION: Approximately 1.15 miles west of the intersection of Pa. Route 611 and Raubsville Road in the village of Raubsville.



REMARKS:

Outcrops of Byram gneiss (Precambrian age); as in **Hexenkopf Rock** (329) to the south, here is exposed one of the oldest rocks in Pennsylvania and North America. Weathering of the gneiss has produced a topographic figure resembling an elephant.

329. HEXENKOPF ROCK

COUNTY: Northampton

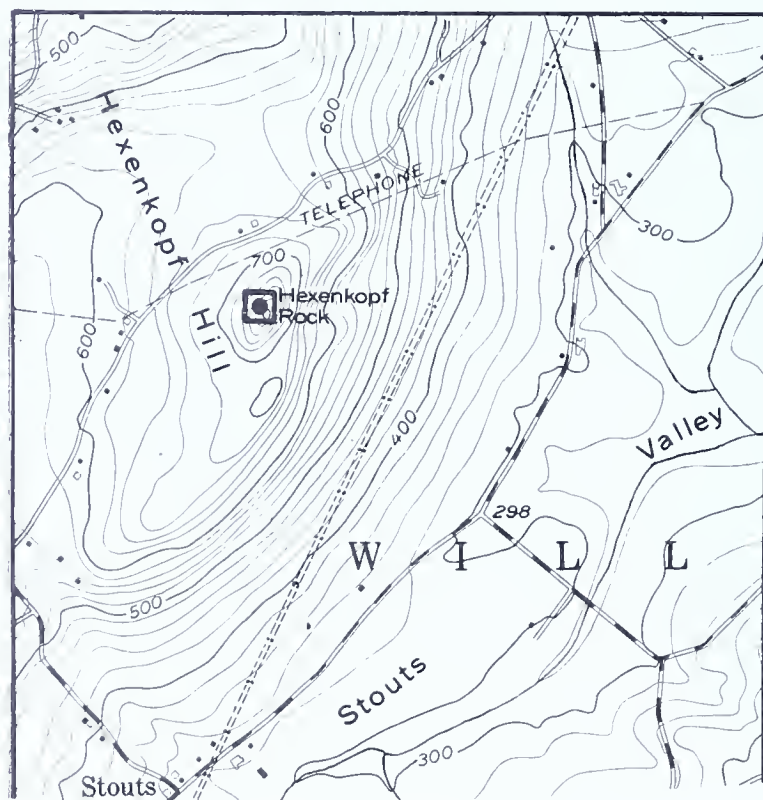
TOWNSHIP: Williams

QUADRANGLE: Riegelsville

LOCATION: Approximately 3-1/4 miles northwest of the Borough of Riegelsville; located at the summit of Hexenkopf Hill.

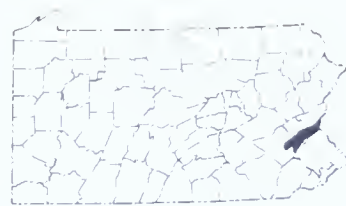
REMARKS: Outcrops of Pochuck gneiss (Precambrian age); one of the oldest rocks in Pennsylvania and North America. The mineral magnetite is present in the rock.

REFERENCE: Miller, B. L., Fraser, D. M., and Miller, R. L. (1939), *Northampton County, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., County Report 48, 496 p.



NEW ENGLAND PROVINCE

READING PRONG SECTION



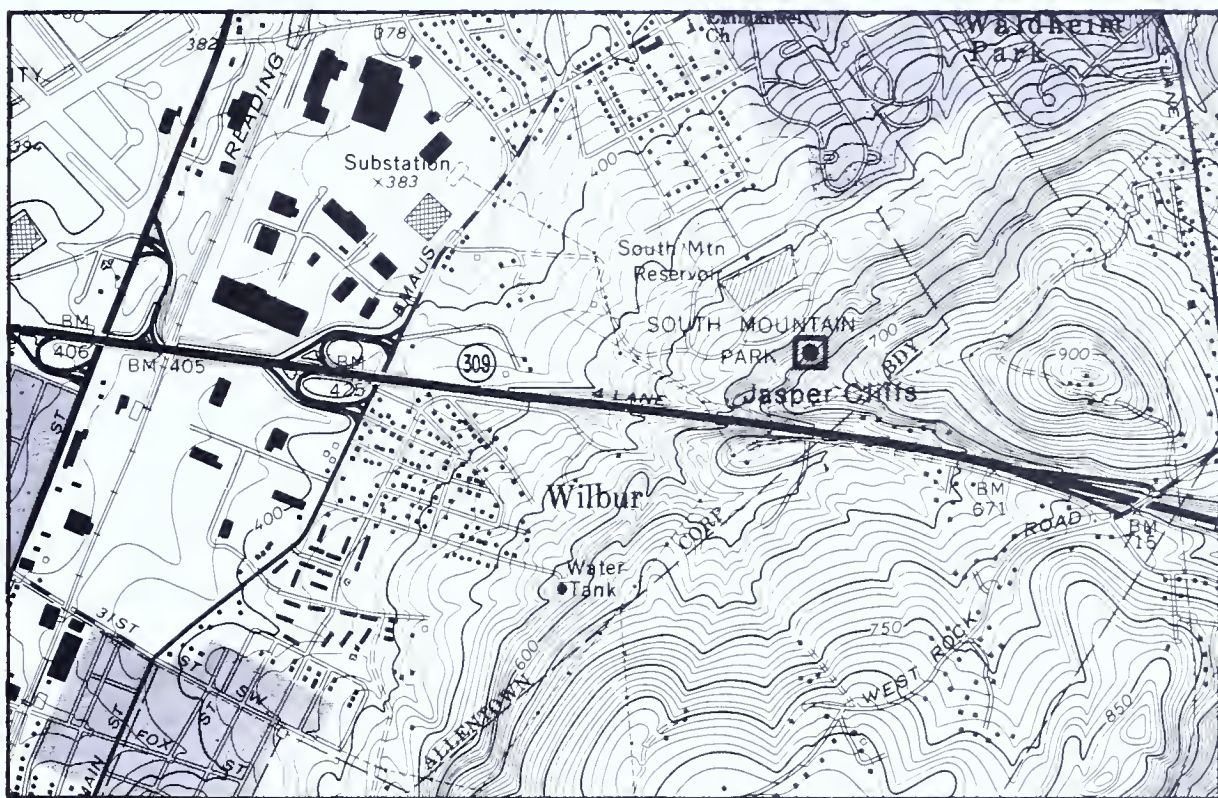
330. JASPER CLIFFS

COUNTY: Lehigh

CITY: Allentown

QUADRANGLE: Allentown East

LOCATION: In the City of Allentown in South Mountain Park.



REMARKS:

The jasper is in the Hardyston Formation (Cambrian age) and is exposed in massive beds forming low cliffs. This is the only known locality in Pennsylvania that has this form of occurrence; it is geologically notable. The jasper is coarse and all traces of bedding planes have been obliterated. Vein quartz is scattered sparsely through the rock, and there are numerous tension cracks and some cavities; these characteristics are very uncommon in jasper outcrops.

REFERENCE:

Miller, B. L., Fraser, D. M., Miller, R. L., and others (1941), *Lehigh County, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., County Report 39, 492 p.

331. MOUNT PENN SCENIC LOOKOUT

COUNTY: Berks

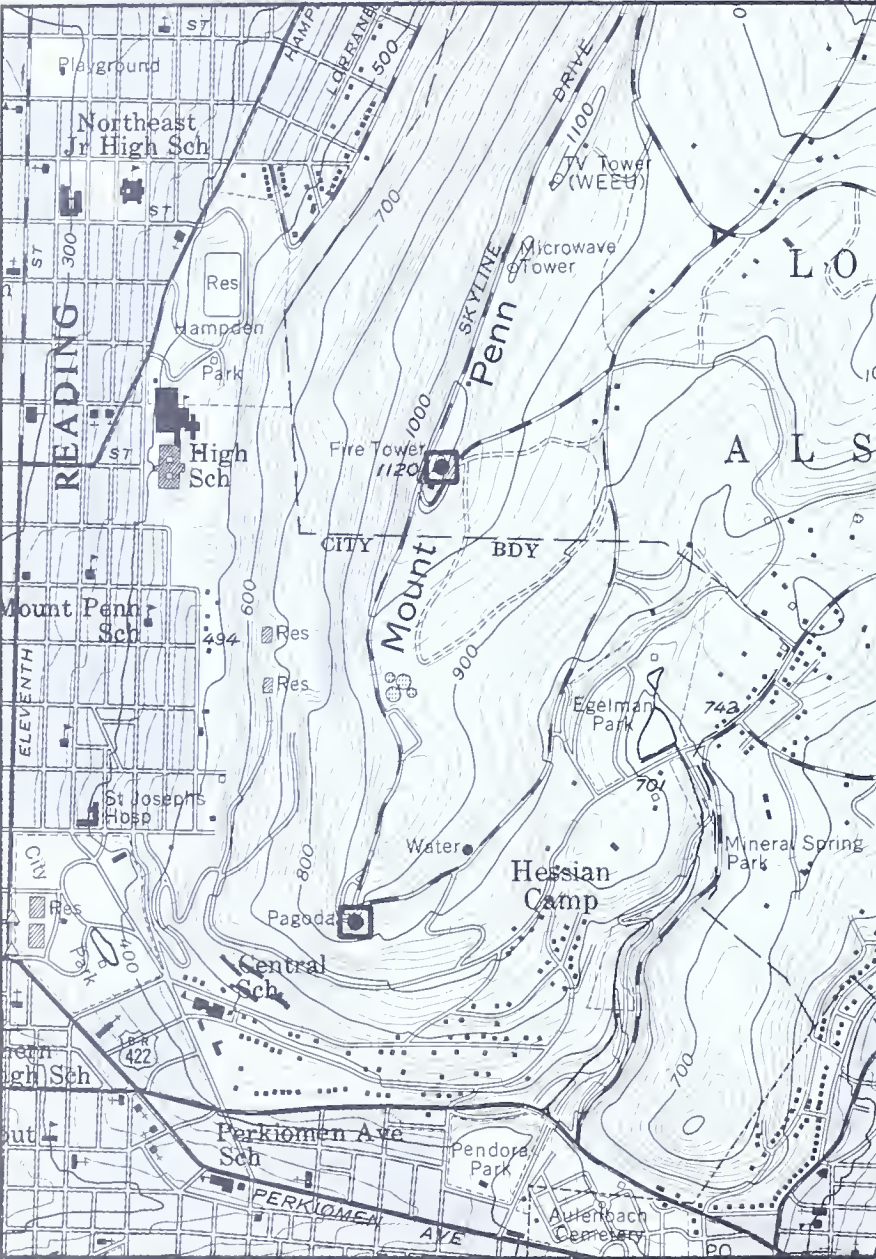
TOWNSHIP: Lower
Alsace

CITY: Reading

QUADRANGLE:
Reading

LOCATION: Skyline
Drive in the City of
Reading and Lower Al-
sace Township.

REMARKS: A scenic
drive along the ridge
of Mount Penn at an
elevation of 800 to
1000+ feet. Along the
drive are the Pagoda
and a lookout tower,
which provide an ex-
cellent view of the
Reading Prong and
Great Valley.



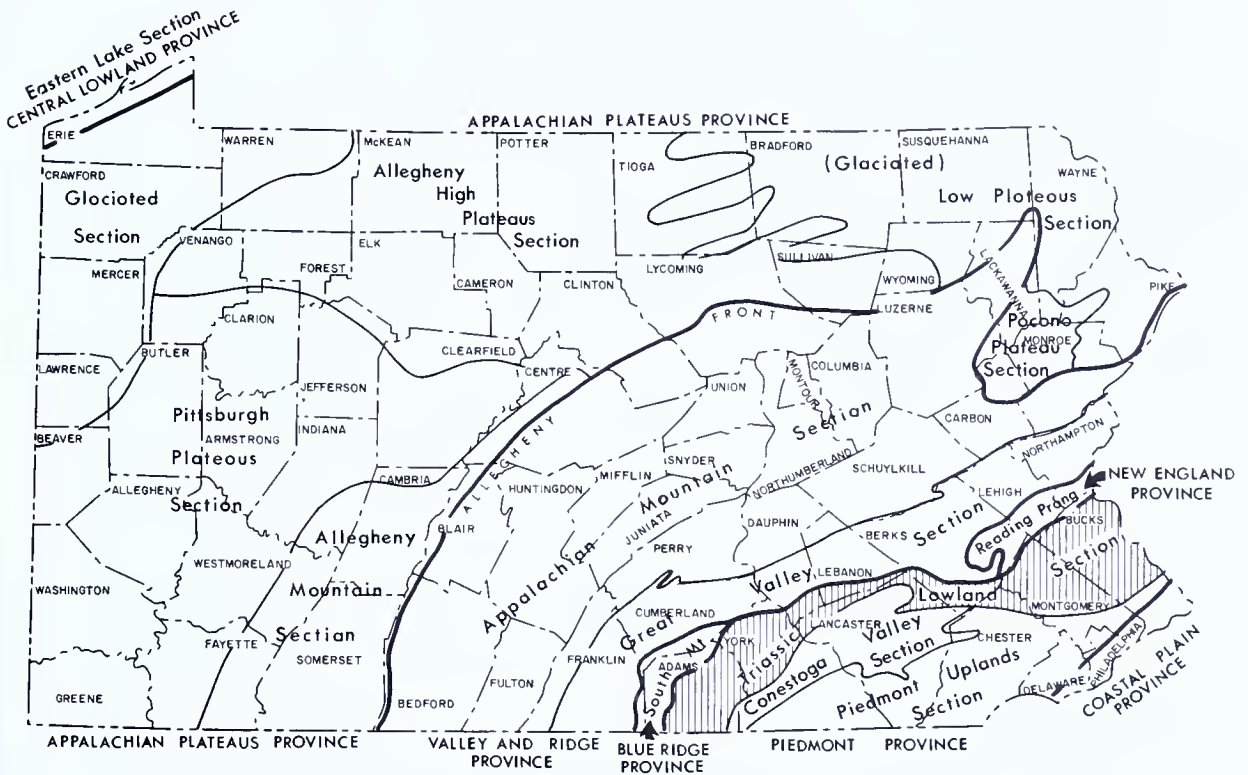
332. **VERA CRUZ JASPER PITS** *(continued)*



PIEDMONT PROVINCE— TRIASSIC LOWLAND SECTION

TOPOGRAPHY

The Triassic Lowland section of the Piedmont province is an uplifted plain formed on relatively soft, red sandstone and shale. Higher ridges mark the locations of sheets of hard, dense volcanic rock or lenses of quartz conglomerate. The general level of this rolling plain lies between elevations of about 400 and 600 feet above sea level. Some ridge tops rise to over 1200 feet. The term “lowland” is a misnomer in Pennsylvania, in that the section is characterized by hills and mountains and the red shale and the Triassic sandstone terrain is actually much higher than the adjacent limestone valleys.



ROCK COLUMN

The red shales and sandstones of Triassic age are the common rocks of the section. Near the northern border beds of limestone conglomerate interbedded with red shale occur in places. This conglomerate contains well-rounded quartzite pebbles, limestone pebbles, and calcareous sandstone pebbles.

OUTSTANDING SCENIC GEOLOGICAL FEATURES OF PENNSYLVANIA

Diabase, a fine-grained igneous rock, is widespread in the form of dikes, sills, and sheets throughout the section. Where the diabase has intruded, it has baked the nearby rocks, making them harder, denser, and less porous. A very small lava flow is exposed at Jacksonwald, 5 miles east of Reading. The description of the rock units is as follows:

SYSTEM	ROCK UNIT	DESCRIPTION
Triassic	Diabase	Black, dense, very fine grained; consists of 90 to 95 percent labradorite and augite.
	Brunswick Formation	Red shale and sandstone, some limestone and quartz conglomerate; altered to black hornfels adjacent to diabase intrusives; fanglomerates along the northern margin.
	Gettysburg Formation	Red coarse-grained sandstone containing interbeds of red shale and quartz conglomerate.
	Lockatong Formation	Gray argillite; altered to black hornfels adjacent to diabase intrusives.
	Stockton Formation	Red, gray, and brown shale and arkose.
	New Oxford Formation	Light-gray coarse-grained sandstone and conglomerate and thin beds of red shale.

STRUCTURE

The regional geologic structure of these rock layers can be described as a homocline having moderately steep northward to northwesterly dips, intersected by faults. Minor cross faults offset some of the rock layers. Major faults occur along the north margin.



PIEDMONT PROVINCE
TRIASSIC LOWLAND SECTION



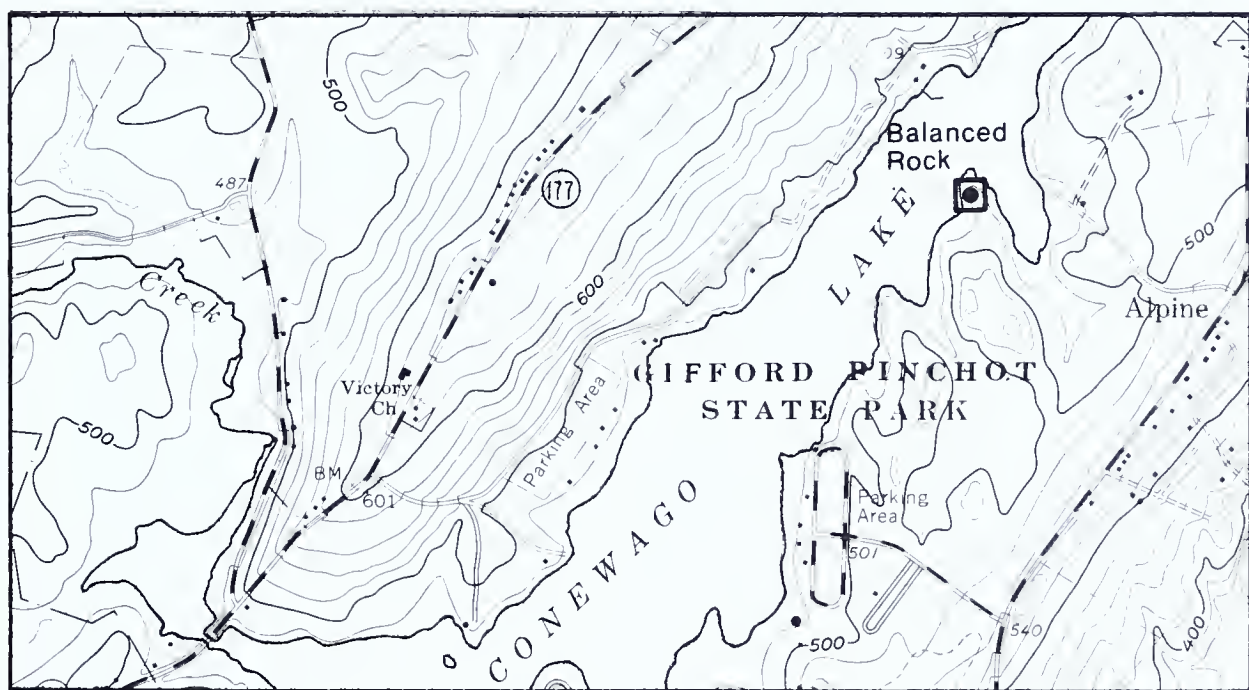
333. BALANCED ROCK

COUNTY: York

TOWNSHIP: Warrington

QUADRANGLE: Wellsville

LOCATION: Within Gifford Pinchot State Park; at Boulder Point on the Boulder Point Trail; 5.8 miles north of the Borough of Dover.



REMARKS:

This large boulder balanced on two small ones is a special example of spheroidal weathering. Chemical and mechanical weathering processes attacked this igneous rock, called diabase (Triassic age), and "rounded" it. The rock was first formed from molten magma, and, as it cooled, its volume shrank and shrinkage or cooling cracks were formed. These cracks later aided in the weathering and rounding of the blocks.

333. BALANCED ROCK (*continued*)



REFERENCE: Hoskins, D. M. (1978), *Gifford Pinchot State Park: Diabase*, Pennsylvania Geological Survey, 4th ser., Park Guide 10.

NOTES:

PIEDMONT PROVINCE

TRIASSIC LOWLAND SECTION



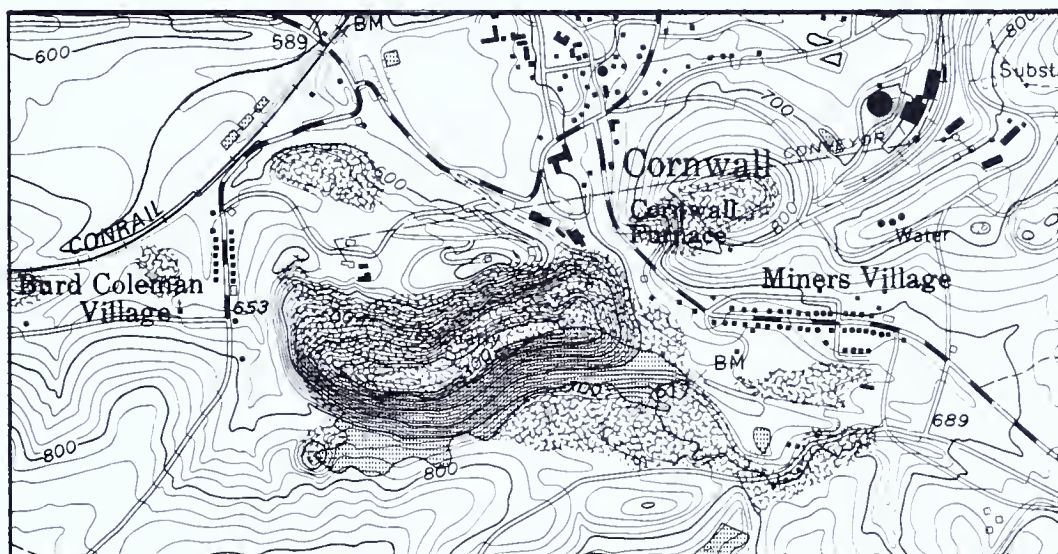
334. CORNWALL MINE

COUNTY: Lebanon

BOROUGH: Cornwall

QUADRANGLE: Lebanon

LOCATION: Between Cornwall and Miners Village, about 5 miles south of the City of Lebanon.



REMARKS: An igneous, diabase layer of Triassic age intruded a sequence of limestone layers. Iron-rich solutions replaced the limestone bedrock and deposited a large iron ore body that had a wide variety of minerals. Mined from 1742 to 1973, it was the oldest continuously operated mine in the United States. The mine provided cannon shot and cannons for the Revolutionary War.

REFERENCES: Gray, Carlyle, and Lapham, D. M. (1961), *Guide to the geology of Cornwall, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., General Geology Report 35, 18 p.
Lapham, D. M. (1972), *Cornwall: the end of an era*, Pennsylvania Geology, v. 3, no. 5, p. 2-5.
Lapham, D. M., and Gray, Carlyle (1973), *Geology and origin of the Triassic magnetite deposit and diabase at Cornwall, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Mineral Resource Report 56, 343 p.

335. DEVILS DEN

COUNTY: Adams

TOWNSHIP: Cumberland

QUADRANGLE: Gettysburg

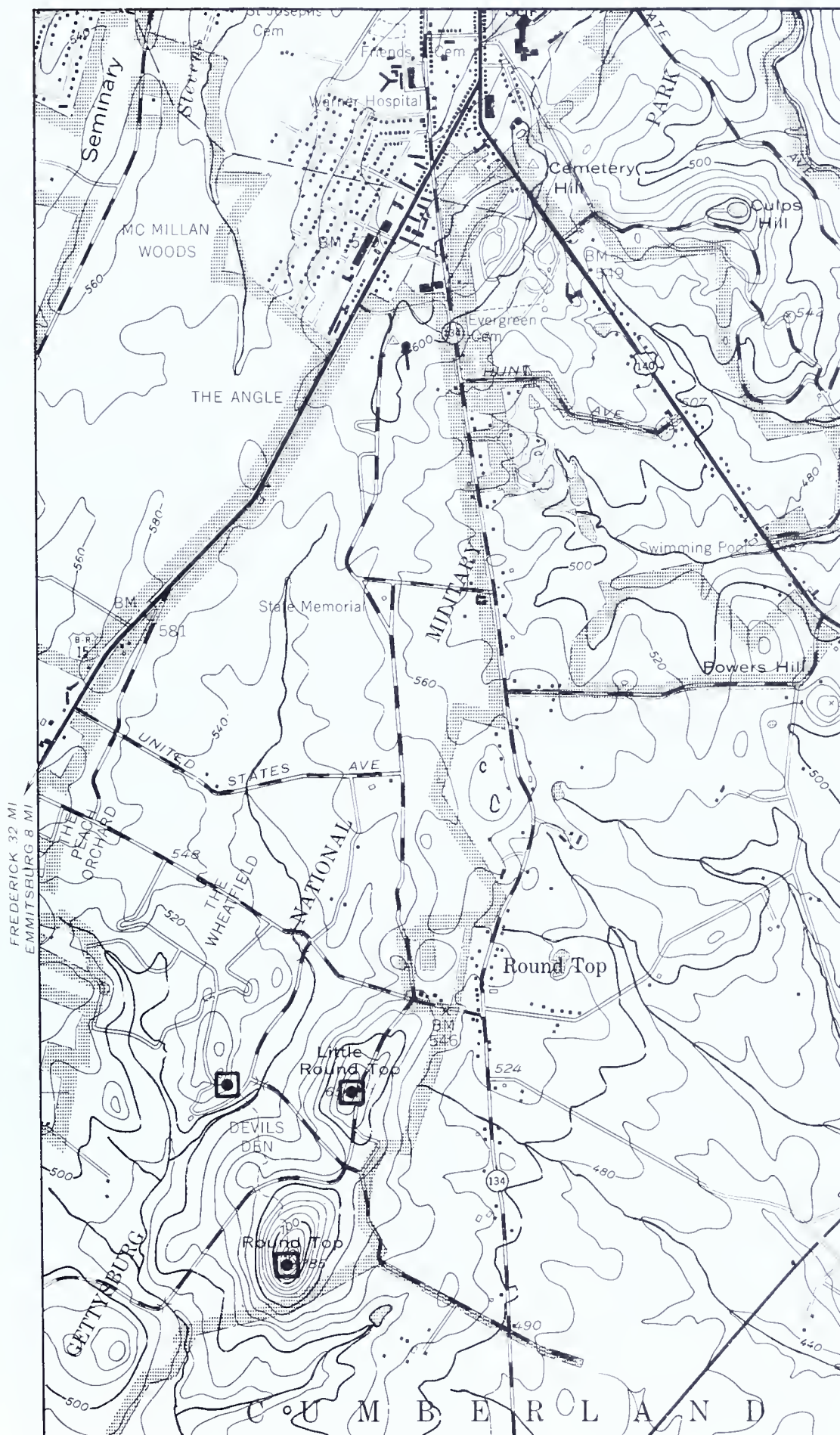
LOCATION: Within the Gettysburg National Military Park.

REMARKS: A mass of diabase boulders facing **Little Round Top** (336) and **Round Top** (337). Thousands of sightseers have climbed these rocks on the Gettysburg battlefield to look over the fields where Pickett's men charged on July 3, 1863. Very few of these Civil War buffs know that these geologic features that Generals Lee and Meade fought among are the outcrop of a diabase sill, called the Gettysburg sill. The sill intruded the Triassic red sandstones and shales that floor the broad Gettysburg Valley 180 million years ago. Few have any idea of the extent to which the battle was influenced by the geology of the region.

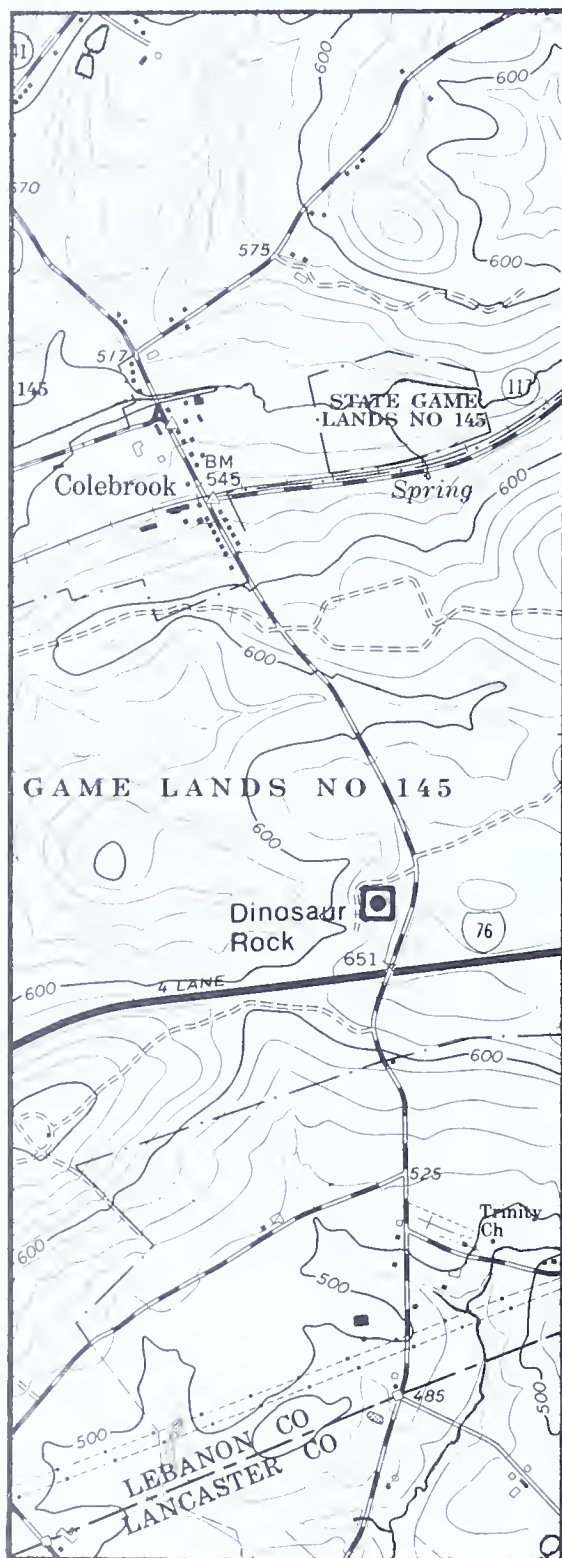


REFERENCE: Brown, Andrew (1962), *Geology and the Gettysburg campaign*, Pennsylvania Geological Survey, 4th ser., Educational Series 5, 15 p.

PIEDMONT PROVINCE TRIASSIC LOWLAND SECTION



338. DINOSAUR ROCK



COUNTY: Lebanon

TOWNSHIP: South Londonderry

QUADRANGLE: Elizabethtown

LOCATION: Approximately 0.75 mile south of Colebrook along Pa. Route 241; on State Game Lands No. 145.

REMARKS: A local name applied to an erosional remnant of a Triassic-Jurassic diabase sheet. The diabase of this large intrusion is a medium- to coarse-grained, dark-gray rock having ophitic texture. The rock in the outcrop is very massive and usually weathers into large spheroidal boulders.



PIEDMONT PROVINCE
TRIASSIC LOWLAND SECTION



339. EAGLE ROCK

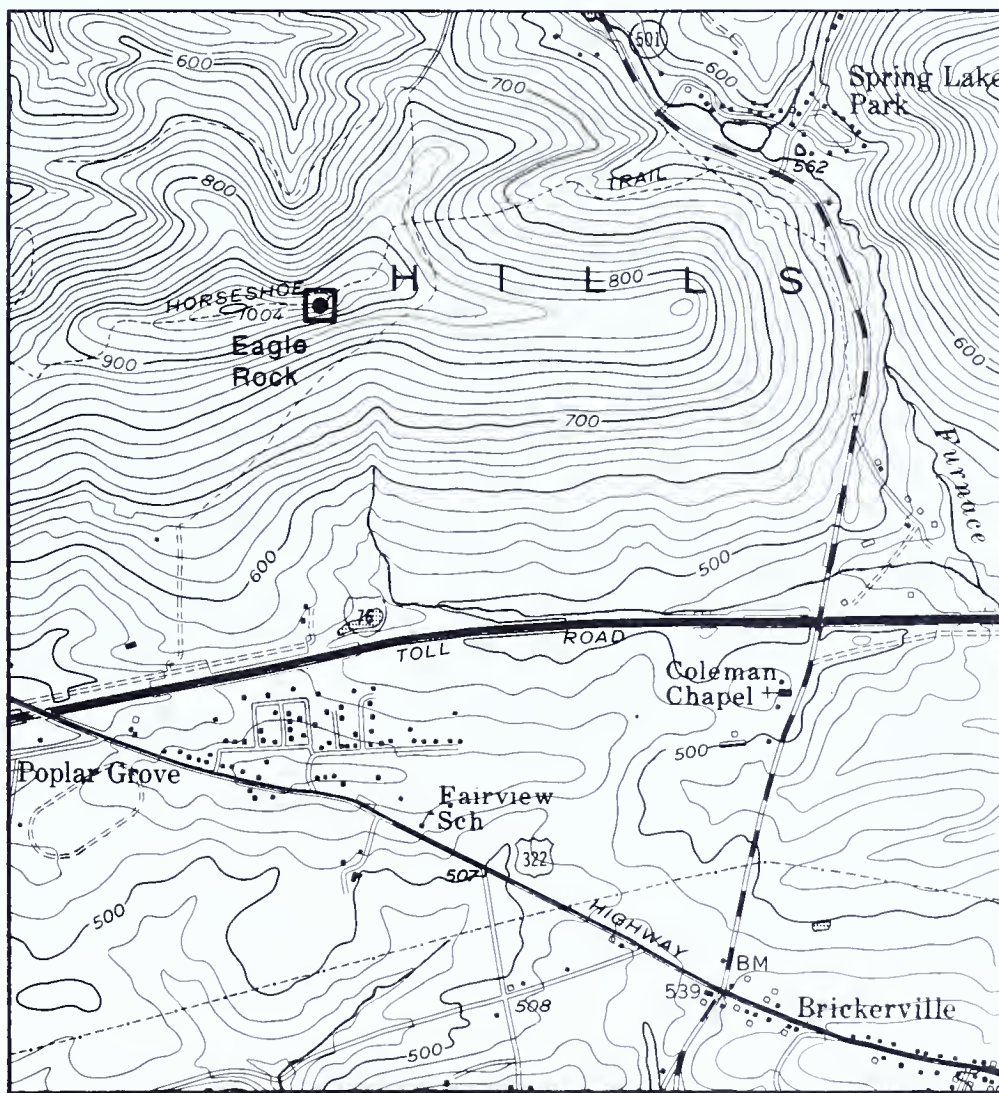
COUNTY: Lancaster

TOWNSHIP: Elizabeth

QUADRANGLE: Lititz

LOCATION: Approximately 1.4 miles northwest of the village of Brickerville (intersection of Pa. Route 501 and U. S. Route 322); along the Horseshoe Trail at elevation 960 feet, between Furnace Creek and Hammer Creek; on Furnace Hills.

REMARKS: Outcrops of quartz conglomerate of the Hammer Creek Formation (Triassic age); one outcrop has weathered unevenly and now resembles the shape of an eagle.



339. EAGLE ROCK *(continued)*



PIEDMONT PROVINCE
TRIASSIC LOWLAND SECTION



340. FALLS OF FRENCH CREEK

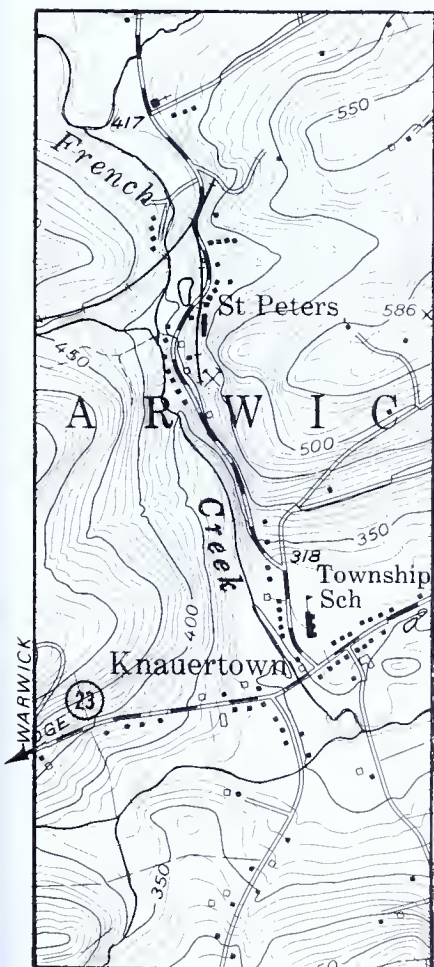
COUNTY: Chester

TOWNSHIP: Warwick

QUADRANGLE: Pottstown

LOCATION: In the village of St. Peters, about 3/4 mile north of Pa. Route 23 at Knauertown.

REMARKS: French Creek passes over a diabase (igneous rock) sheet in a series of rushing cascades over diabase boulders as the creek descends some 50 feet to the valley.



340. FALLS OF FRENCH CREEK *(continued)*





341. GOVERNORS STABLES

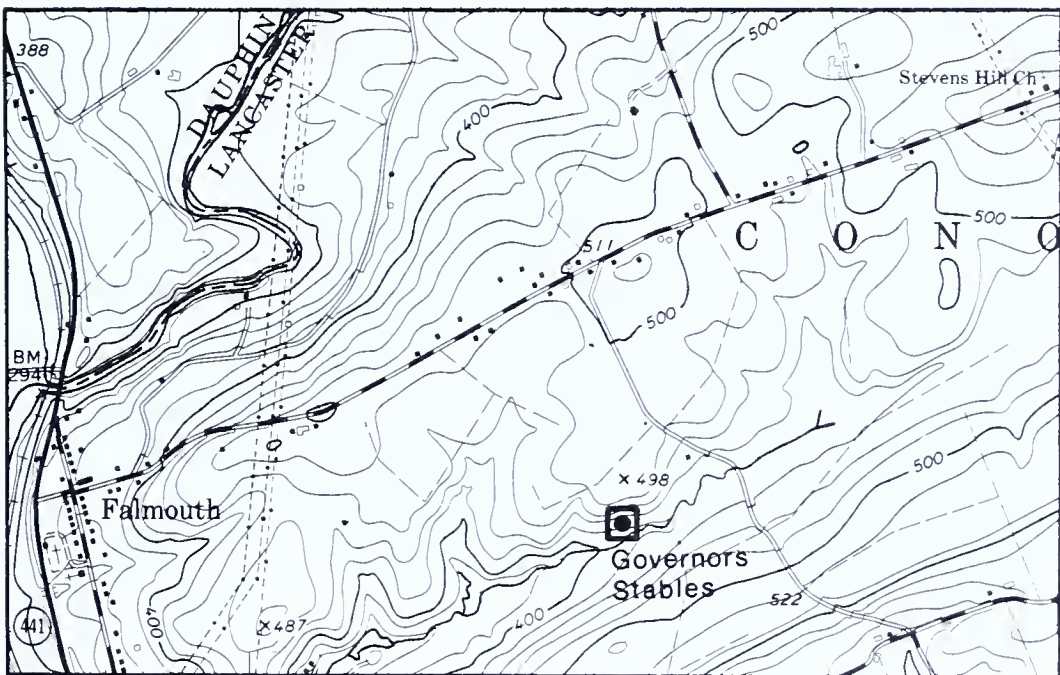
COUNTY: Lancaster

TOWNSHIP: Conoy

QUADRANGLE: Middletown

LOCATION: From Falmouth, 1 mile northeast on the Falmouth-Elizabethtown road onto a dirt road.

REMARKS: Before 1800 a notorious horse thief known as "The Governor" established his headquarters here. Another legend has it that the cave was visited by Andrew Curtin, Governor of Pennsylvania from 1861 to 1867, who took shelter here with his aides during a storm while traveling the Falmouth-Elizabethtown Pike on the way from Lancaster to Harrisburg. This is a boulder cave made up of two huge boulders capped by a third boulder, surrounded by other boulders; it has a convenient natural chimney. The rounded boulders are composed of Triassic diabase (commonly called ironstone).



- REFERENCES: Bolles, W. H. (1978), *Governor's Stables*, Pennsylvania Geology, v. 9, no. 1, p. 6-7.
 Reich, J. R., Jr. (1974), *Caves of southeastern Pennsylvania*, Pennsylvania Geological Survey, 4th ser., General Geology Report 65, p. 27.

342. NOCKAMIXON CLIFFS

COUNTY: Bucks

TOWNSHIP: Nockamixon

QUADRANGLE: Riegelsville

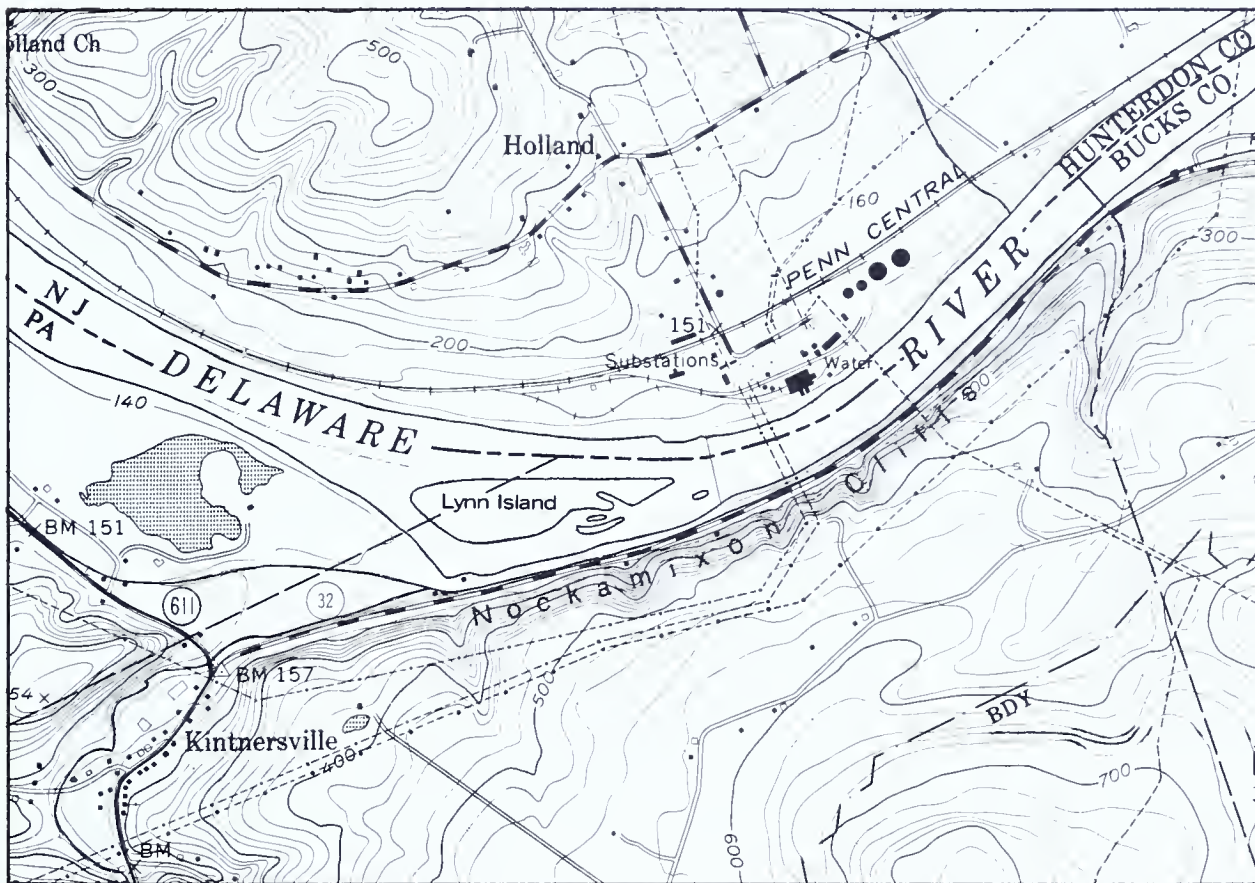
LOCATION: Along Pa. Route 32 and the Delaware River; 1/2 mile northeast of Kintnersville.

REMARKS: Shales, siltstones, and sandstones of the Brunswick Formation (Triassic age) were eroded by the Delaware River. These rocks form near-vertical cliffs because they have been partially metamorphosed by the nearby Coffman Hill diabase sheet and are therefore denser, harder, and more resistant than similar rocks to the northwest of Kintnersville. The cliffs are a spectacular scenic geologic site along the Delaware River.



REFERENCE: Drake, A. A., Jr., McLaughlin, D. B., and Davis, R. E. (1967), *Geologic map of the Riegelsville quadrangle, Pennsylvania-New Jersey*, U. S. Geological Survey Geologic Quadrangle Map GQ-593.

PIEDMONT PROVINCE
TRIASSIC LOWLAND SECTION



NOTES:

343. POTHOLES IN THE SUSQUEHANNA RIVER

COUNTY: Lancaster

TOWNSHIP: Conoy

QUADRANGLE: York Haven

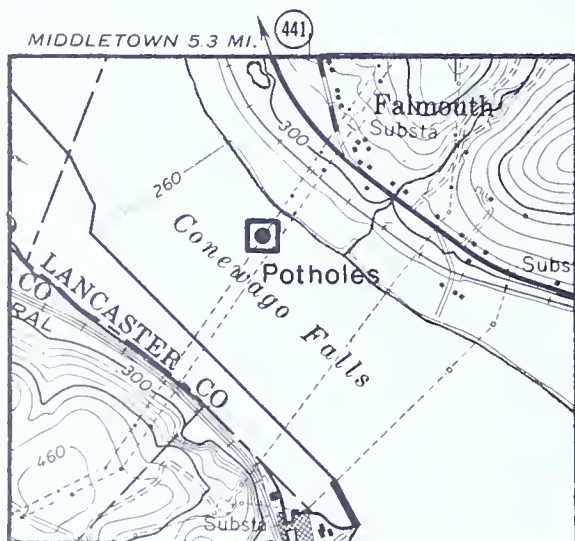
LOCATION: **Conewago Falls** (344) in the Susquehanna River opposite the village of Falmouth.

REMARKS: A series of extremely large potholes in diabase (Triassic age) in the bed of the Susquehanna River; visible yearly at low water levels.

REFERENCES: Beck, H. H. (1948), *Prolonged drouth uncovers geologic phenomenon*, Pennsylvania Department of Internal Affairs Bulletin, v. 16, no. 2, p. 3-6.

_____ (1948), *The pot holes of Conewago Falls*, Pennsylvania Academy of Science Proceedings, v. 22, p. 127-230.

Myers, R. E. (1953), *The Conewago potholes of the Susquehanna River*, Pennsylvania Angler, v. 22, no. 10, p. 6-9, 25-27.



PIEDMONT PROVINCE

TRIASSIC LOWLAND SECTION



345. RINGING ROCK

COUNTY: Bucks

TOWNSHIP: Bridgeton

QUADRANGLE: Riegelsville

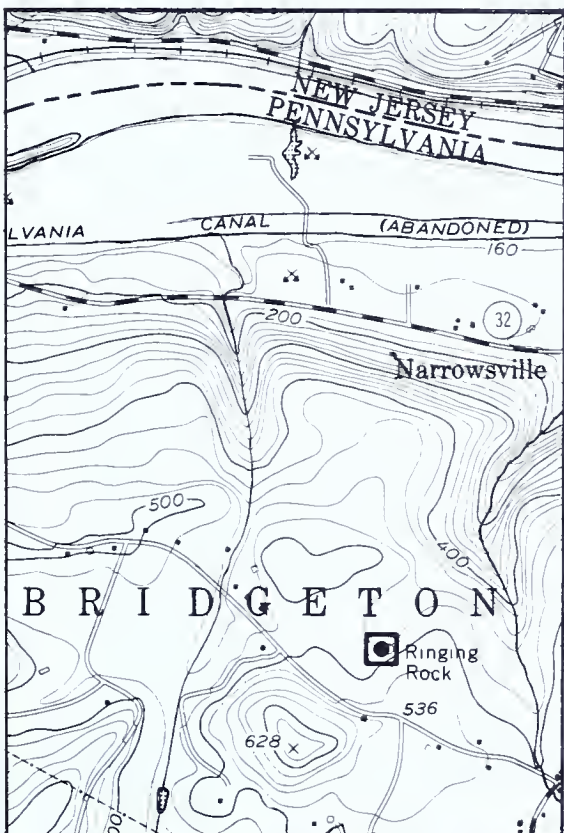
LOCATION: About 1 mile west of the village of Upper Black Eddy; a Bucks County park.

REMARKS: A diabase boulder field where the various boulders have different sounds when hit with a hammer; a tune may be played on the rocks. This is the largest "ringing-rock" boulder field in the East.

REFERENCES: Faas, R. W., and Flocks, J. M. (1966), *Some acoustic properties of the Ringing Rocks diabase, Kintnersville, Pennsylvania* [abs.], Pennsylvania Academy of Science Proceedings, v. 40, no. 1, p. 12.

Fackenthal, B. F., Jr. (1932), *Ringing Rocks of Bridgeton Township, Bucks County, Pennsylvania*, Bucks County Historical Society, Papers 5, p. 212-221.

Redmond, Andrew (1976), *Ringing Rocks*, Bucks County Department of Parks and Recreation, Langhorne, Pennsylvania, 8 p.

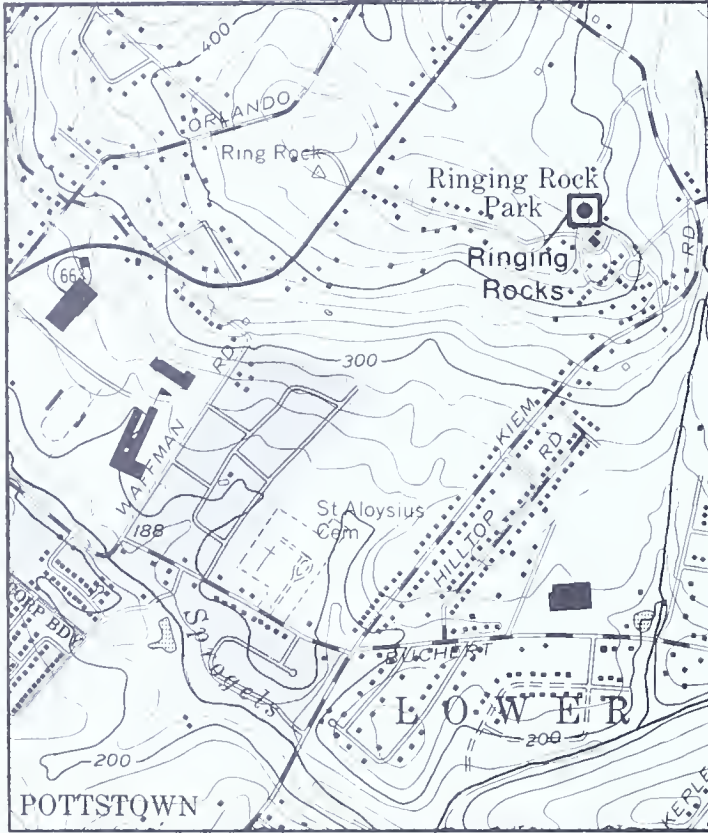


346. RINGING ROCKS

COUNTY: Montgomery

TOWNSHIP: Lower Pottsgrove

QUADRANGLE: Sassamansville



LOCATION: Ringing Hill Fire Company Park; 1.2 miles north of Pottstown on Pa. Route 663 (North Charlotte Street); the entrance to the park is from the intersection of Route 663 and White Pine Lane.

REMARKS: A diabase boulder field where various boulders have a different sound when struck with a hammer; a tune may be played on the rocks.



PIEDMONT PROVINCE
TRIASSIC LOWLAND SECTION



347. THE LOOKOUT

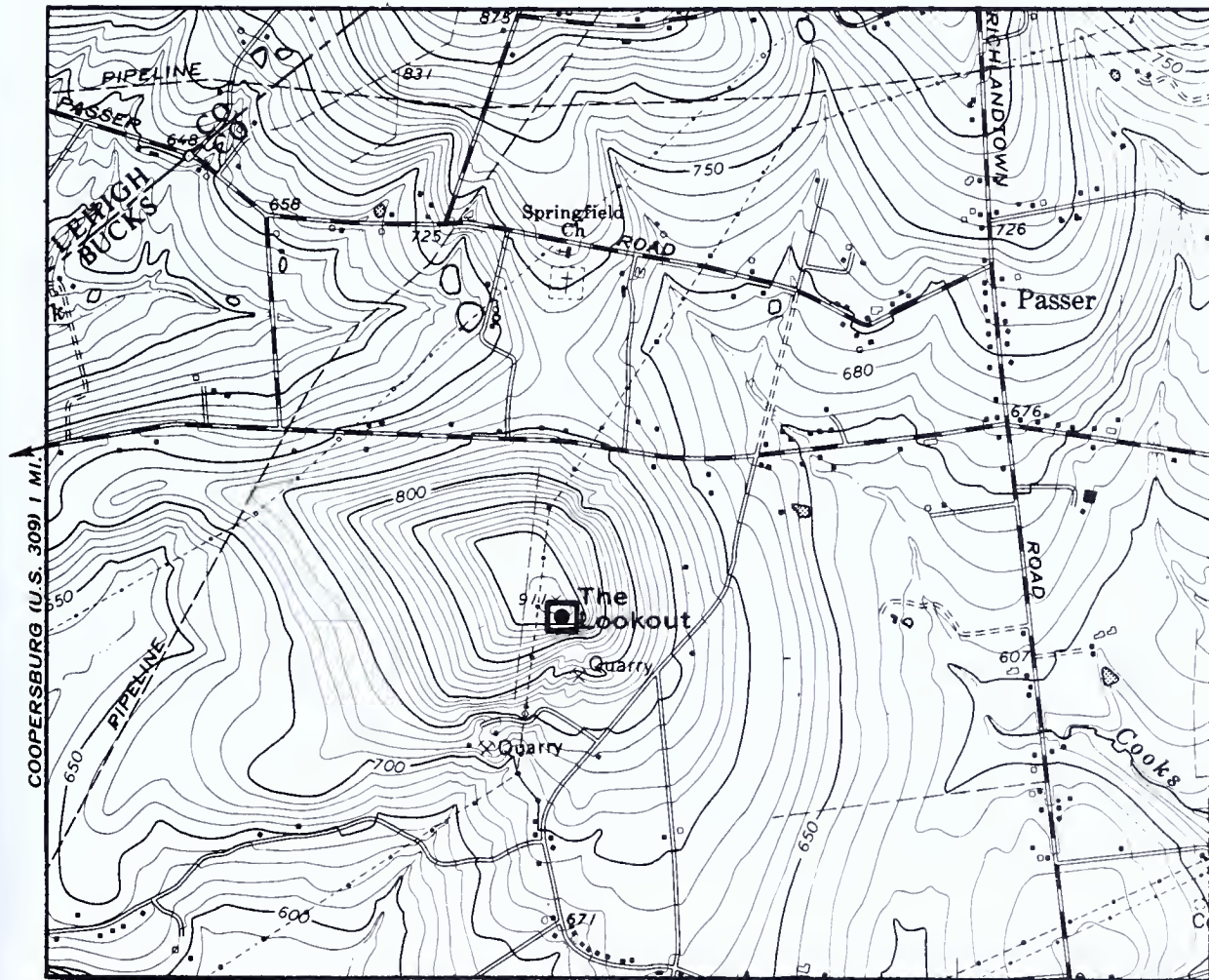
COUNTY: Bucks

TOWNSHIP: Springfield

QUADRANGLE: Hellerton

LOCATION: Approximately 5 miles south of Hellertown and 0.8 mile west of Richlandtown Road.

REMARKS: A large igneous intrusive sheet (Haycock Sheet, Triassic age) of diabase has weathered unevenly, leaving high peaks; **The Lookout** and **Rock Hill** (348) (East Rockhill Township) are examples. The diabase is a dark-gray to black, coarse-grained, igneous rock predominantly containing pyroxene and plagioclase minerals.



PIEDMONT PROVINCE CONESTOGA VALLEY SECTION



A detailed description of the rock units in this section follows:

SYSTEM	ROCK UNIT	DESCRIPTION
Ordovician	Cocalico Formation	Light-brown shale.
	Myerstown Formation	Dark-gray thin-bedded limestone.
	Annaville Formation	Gray pure limestone.
	Beekmantown Group	
	Ontelaunee Formation	Gray thick-bedded dolomite.
Cambrian	Epler Formation	Gray interbedded limestone and dolomite; fossiliferous.
	Stonehenge Formation	Gray limestone; fossiliferous.
	Conococheague Group	
	Richland Formation	Gray interbedded limestone and dolomite.
	Millbach Formation	Pinkish-gray limestone.
	Snitz Creek Formation	Gray sandy dolomite.
	Buffalo Springs Formation	Yellowish-gray dolomite interbedded with light-gray limestone; thick beds of sandy limestone weather to porous sandstone.
	Zooks Corner Formation	Gray dolomite; sandy, crossbedded, and ripple marked.
	Elbrook Formation	Light-gray limestone and dolomite.
	Conestoga Formation	Medium-gray impure limestone; includes micaceous limestone and phyllite.
	Ledger Formation	Light-gray sparkling dolomite.
	Kinzers Formation	Gray shale; in part, fossiliferous limestone and a pure, high-calcium limestone.
	Vintage Formation	Gray dolomite.
	Antietam Quartzite	Gray iron-stained quartzite.
	Harpers Formation	Greenish-gray phyllite schist containing quartzite layers.
Precambrian	Chickies Formation	Light-gray, hard, dense quartzite; includes Hellam Conglomerate Member.
	Metabasalt	Occur in small areas in northern York County.
	Volcanic slate	
	Metarhyolite	

ROCK STRUCTURE

The cumulative effects of repeated periods of mountain building have resulted in a complex structural pattern made up of distorted folds and thrust faults that break many of the fold structures.

349. FRUITVILLE QUARRY FOSSIL SITE

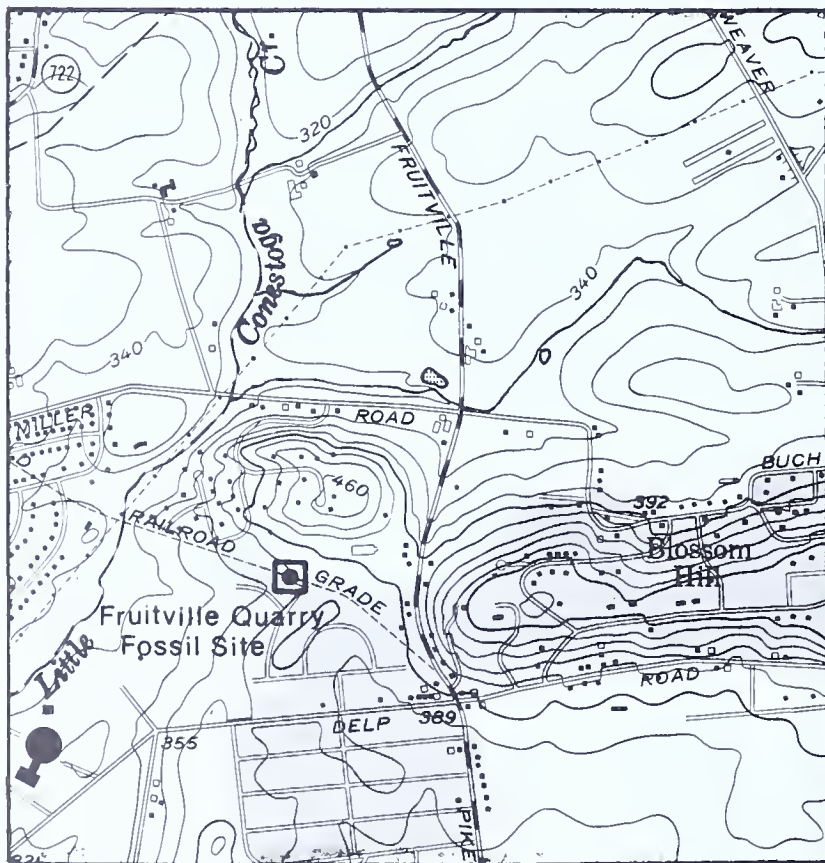
COUNTY: Lancaster

TOWNSHIP: Manheim

QUADRANGLE: Lancaster

LOCATION: Four miles north of Lancaster; a Franklin and Marshall College geology field laboratory.

REMARKS: Limited genera and individuals in a Lower Cambrian shaly siltstone (Kinzers Formation). Outstanding examples of two trilobite genera, *Paedumias* and *Olenellus*, are found; a site of the oldest fossils found in Pennsylvania.



PIEDMONT PROVINCE
CONESTOGA VALLEY SECTION



350. GETZ FARM FOSSIL LOCALITY

COUNTY: Lancaster

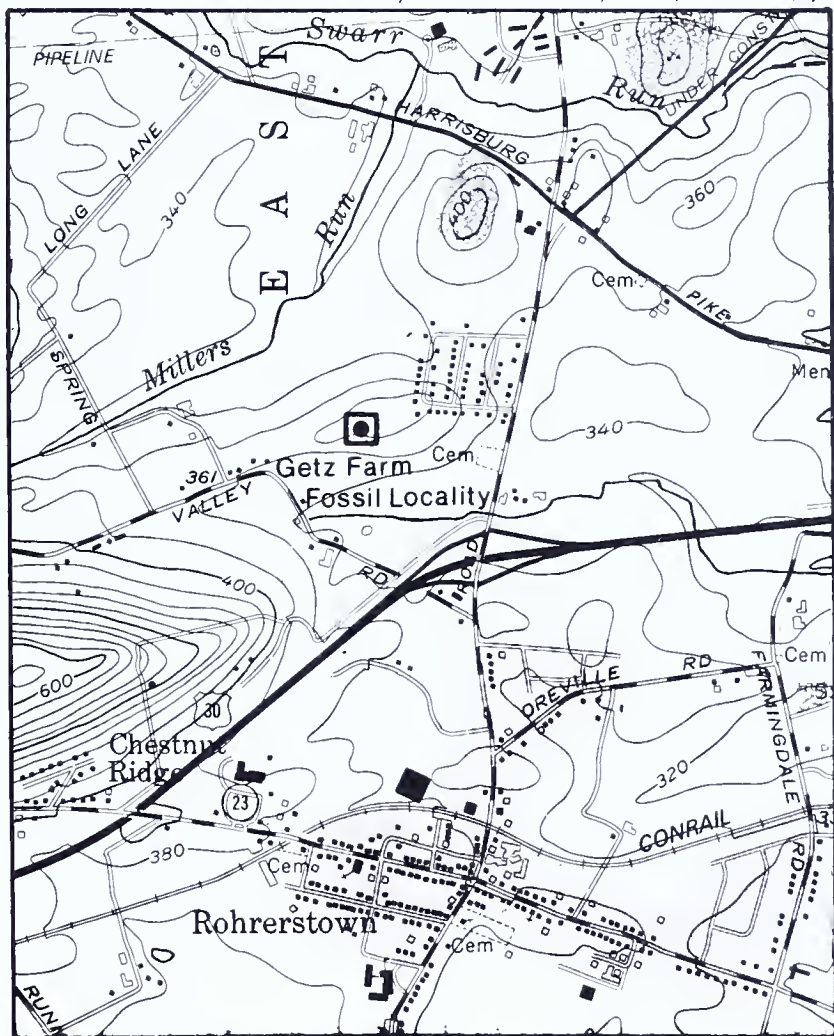
TOWNSHIP: East Hempfield

QUADRANGLE: Lancaster

LOCATION: Approximately 1 mile north of Rohrerstown.

REMARKS: A unique site of Lower Cambrian fossils, chiefly trilobites; the site from which an almost 500-specimen collection came, now at the Peabody Museum (Yale University); the type locality for the trilobite *Olenellus getzi*. Trilobites are present in shale of the Kinzers Formation.

REFERENCE: Dunbar, C. O. (1925), *Antennae in Olenellus getzi*, new species, American Journal of Science, Fifth Series, v. 9, no. 52, p. 303-308.



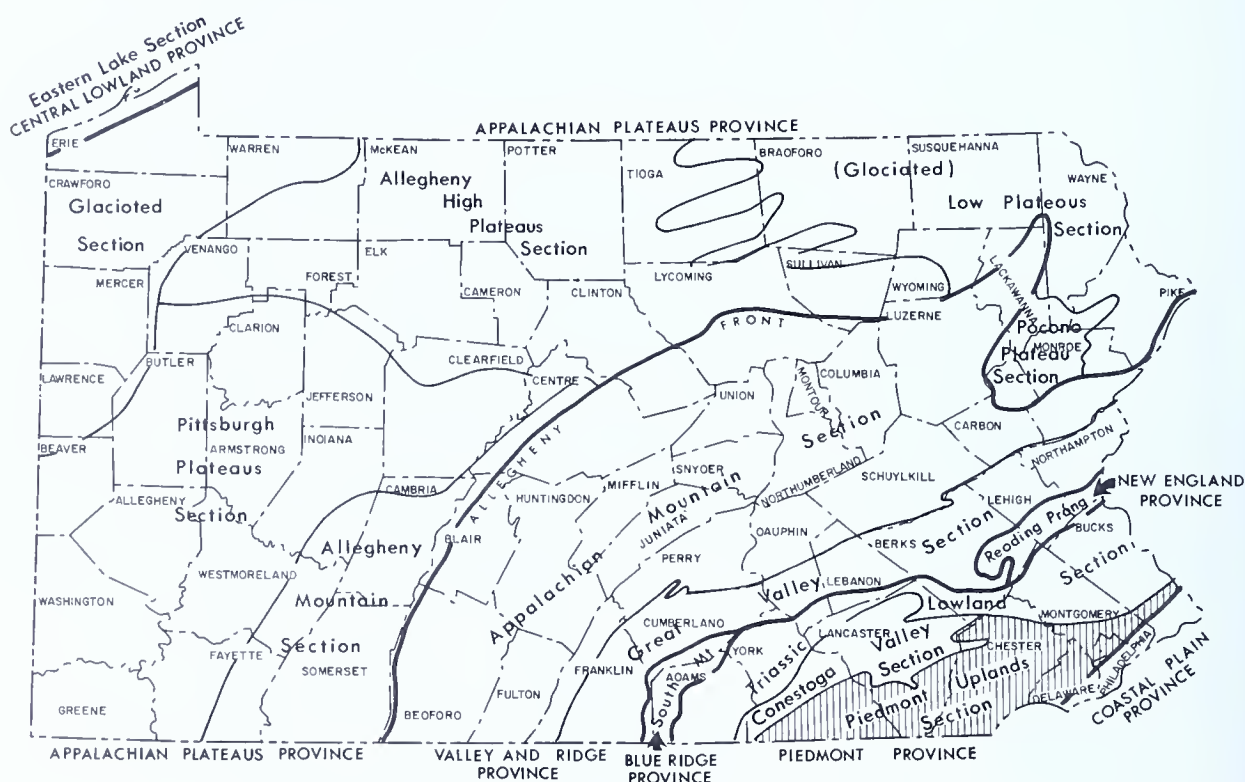
PIEDMONT PROVINCE — PIEDMONT UPLANDS SECTION

TOPOGRAPHY

The main topographic expression of the section is a series of northeast-southwest-trending uplands of rounded hills dissected by relatively narrow valleys. The Honeybrook Upland is typical, consisting of Welsh Mountain, Mine Ridge, and the South Valley Hills, having a gentle rise in elevation of 150 to 200 feet above the surrounding valleys. A rolling surface dotted with rounded boulders of anorthosite, granodiorite, and quartzite, as well as rock fence rows, is characteristic of the upland. The oldest formation in these hills is the Chickies Quartzite, which has the massive Hellam Conglomerate Member at its base.

West of the Susquehanna River, from Red Lion westward to the Maryland line, the section contains a divide which is mostly below 900 feet in elevation, but southward, as far as Shrewsbury, it has a broad top over 1000 feet in elevation. Northwest of this central divide the upland slopes toward the Hanover-York Valley, where it terminates abruptly at elevations of 700 to 900 feet.

East of the Susquehanna River the section is characterized as a dissected upland having narrow interstream areas and flat-topped summits.



PIEDMONT PROVINCE
PIEDMONT UPLANDS SECTION



ROCK COLUMN

The rocks of the Piedmont Upland section are metamorphic and igneous types of Late Cambrian to Precambrian age that consist chiefly of schists and quartzites. The igneous rocks of the Piedmont range from granite to very basic rocks, largely altered to serpentinite, and usually weathered to deep soils. Outcrops are scarce, and the best exposures are found in rail-road and highway cuts, atop high ridges, and in quarries.

The metamorphic rocks of the section are chiefly schists, quartzites, and gneisses.

A detailed description of the rock units present follows:

SYSTEM	ROCK UNIT	DESCRIPTION
Cambrian	Antietam Formation	Slabby, light-gray to rusty-colored schist and quartzite.
	Harpers Formation	Garnetiferous chlorite schist; gray, sandy phyllite
	Chickies Quartzite Hellam Conglomerate Member	Light-gray hard massive quartzite; conglomerate at base
Precambrian	Peach Bottom Slate	Blue-black slate
	Cardiff Conglomerate	Quartz conglomerate; greenish-gray, weathering to red, pebbles to 3 inches in length
	Peters Creek schist and quartzite	Chlorite-sericite schist; quartzite
	Wissahickon Formation	Sparkling, grayish-blue to green schist
	Albite-muscovite- chlorite schist	
	Albite-muscovite- chlorite-quartz schist	
	Albite-chlorite schist	
	Chlorite-muscovite schist	
	Chloritoid schist	
	Marburg Schist	Silvery-green schist
	Wakefield Marble	White marble
	Cockeysville Marble	Crystalline micaceous marble
	Setters Quartzite	Tan quartzite.
	Serpentine and actinolite schist	Magnesium-rich rock, usually green
	Gabbro, gabbroic gneiss, and metagabbro	Dark-colored calcic plagioclase, hypersthene, and quartz rock
	Granite gneiss	Light-pink color; essential minerals are quartz, microcline, hornblende, and occasional biotite.
	Hornblende gneiss	Dark-gray hornblende makes up about 50 percent of the rock and labradorite the other 50 percent

OUTSTANDING SCENIC GEOLOGICAL FEATURES OF PENNSYLVANIA

SYSTEM	ROCK UNIT	DESCRIPTION
Precambrian	Graphitic gneiss	Light-gray gneiss; rock exhibits a speckled brown and white appearance. Graphite occurs in flakes disseminated throughout the gneiss. It exhibits a brilliant, glistening, tin-white metallic luster which is helpful in identification.
	Metabasalt	Green schistose rock composed of albite, hornblende, and epidote.
	Baltimore Gneiss	Graphite-biotite gneiss.
	Quartz monzonite and quartz diorite	Light-colored; composed of quartz, feldspar, and biotite; banded.
	Anorthosite	Blue-gray; weathers into large spheroidal boulders; composed of plagioclase feldspar, hornblende, actinolite, augite, and accessory minerals.
	Granodiorite	Medium-grained quartz-feldspar-mica rock; light-colored pinkish to greenish cast.
	Franklin Limestone	White marble containing graphite.
	Pickering Gneiss	Graphic gneiss; dark colored.

ROCK STRUCTURE

The major structure of the Piedmont Upland section is the Mine Ridge anticline, which crosses the entire section and in the southern part is known as the Tucquan anticline. Thrust and normal faults are common. The Martic overthrust, referred to as the Martic Line, is still a controversy as to whether it is a thrust fault, a gradational contact, or a metamorphic-grade contact.



351. BLACK ROCK

COUNTY: Lancaster

TOWNSHIP: Colerain

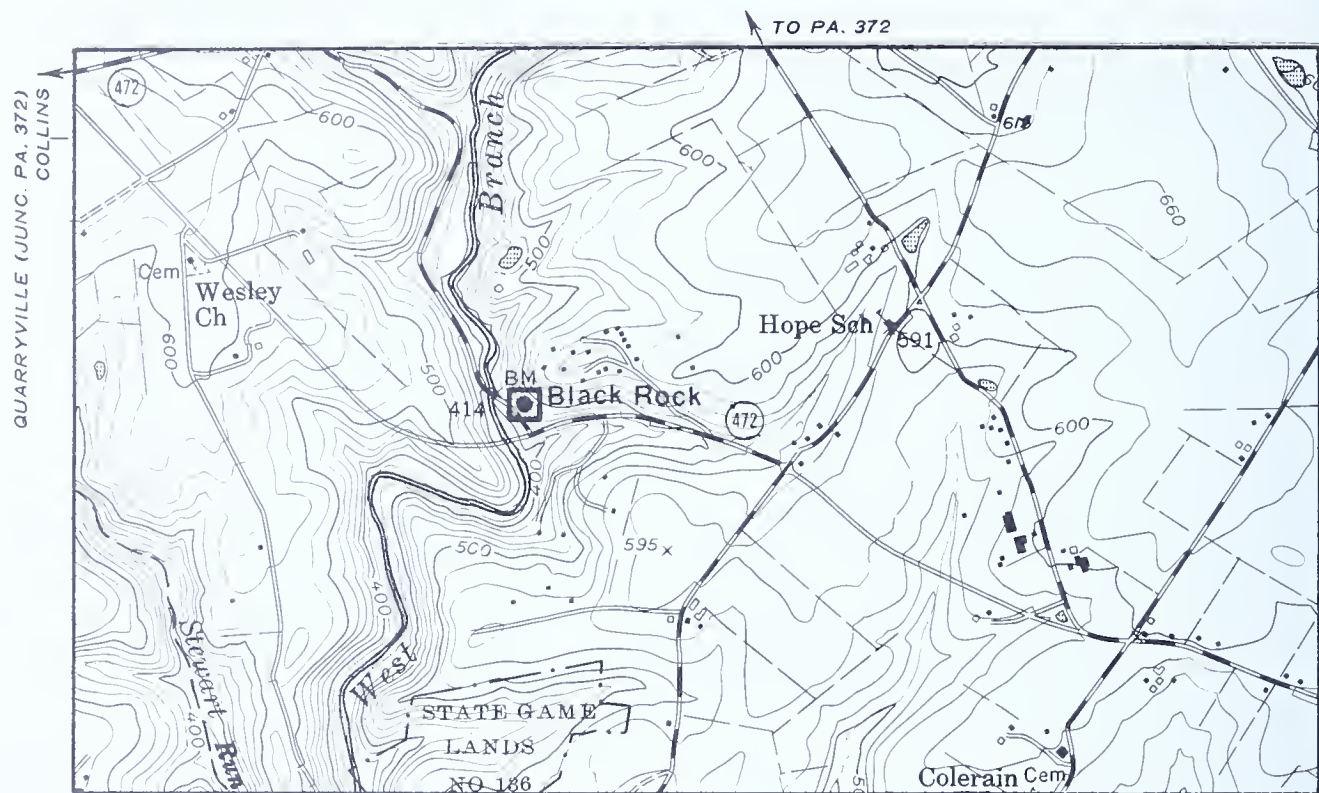
• • QUADRANGLE: Kirkwood

LOCATION: At the intersection of Pa. Route 472 and the West Branch of Octoraro Creek; 1.9 miles northwest of Kirkwood.

REMARKS: Massive outcrops of albite-chlorite schist of the Wissahickon Formation (Precambrian(?) age) in a narrow gorge of the West Branch produce a highly scenic setting. A public spring marked "Black Rock" is nearby.



351. **BLACK ROCK** (continued)



PIEDMONT PROVINCE

PIEDMONT UPLANDS SECTION



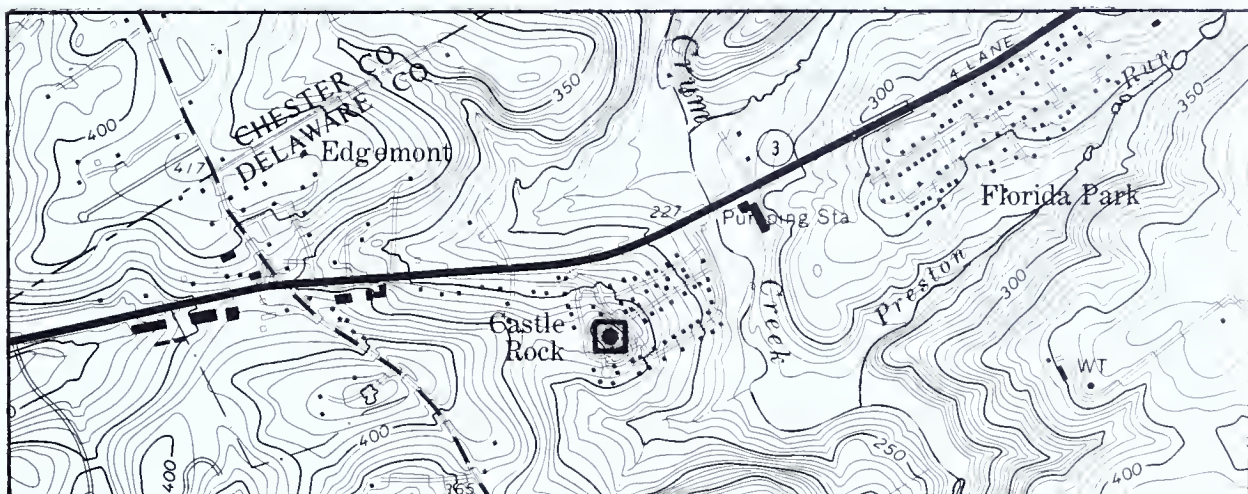
352. CASTLE ROCK

COUNTY: Delaware

TOWNSHIP: Edgemont

QUADRANGLE: Media

LOCATION: Adjacent to and south of Pa. Route 3 about 2 miles west of Newtown Square on the west bank of Crum Creek.



REMARKS: Erosional remnants of a large and unusual outcrop of enstatite rock forms a "castle-like" appearance; from the top of the "castle-towers" one can view the countryside. C. E. Hall wrote in 1885 that Castle Rock "was known as a romantic spot" (p. 38 in reference below). To-day, a housing development surrounds the feature.

REFERENCE: Hall, C. E. (1885), *Field notes in Delaware County*, Pennsylvania Geological Survey, 2nd ser., Report C5, 128 p.



353. CHICKIES ROCK

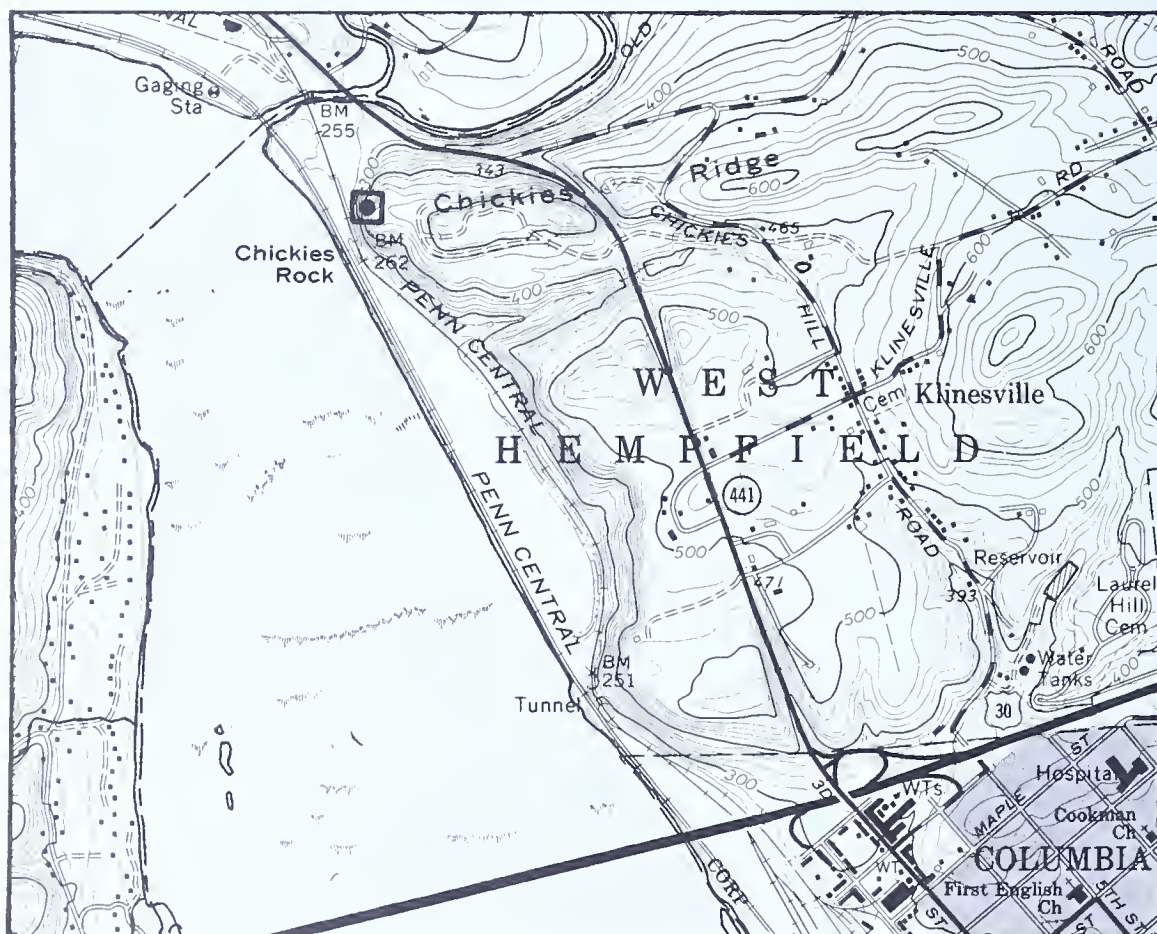
COUNTY: Lancaster

TOWNSHIP: West Hempfield

QUADRANGLE: Columbia West

LOCATION: One mile north of the Borough of Columbia.

REMARKS: A magnificent anticline of Lower Cambrian Chickies Quartzite is exposed along the Susquehanna River at the west end of Chickies Ridge. This is also the site of a fine overlook and picnic area atop the anticline. The Chickies Quartzite contains rare animal borings, or tubes, called "scolithus tubes"; these were once thought to be a Cambrian-age marine worm, *Scolithus*.



PIEDMONT PROVINCE
PIEDMONT UPLANDS SECTION



(Photograph by Grant Heilman)

REFERENCES:

- Frazer, Persifor, Jr. (1880), *The geology of Lancaster County, Pennsylvania* Geological Survey, 2nd ser., Report CCC, 350 p.
- Goodwin, P. W., and Anderson, E. J. (1974), *Associated physical and biogenic structures in environmental subdivision of a Cambrian tidal sand body*, *Journal of Geology*, v. 82, p. 779-794.
- Stose, G. W., and Jonas, A. I. (1933), *Geology and mineral resources of the Middletown quadrangle, Pennsylvania*, U. S. Geological Survey Bulletin 840, 86 p.

354. CHIMNEY ROCK

COUNTY: York

TOWNSHIP: Hellam

QUADRANGLE: Columbia West

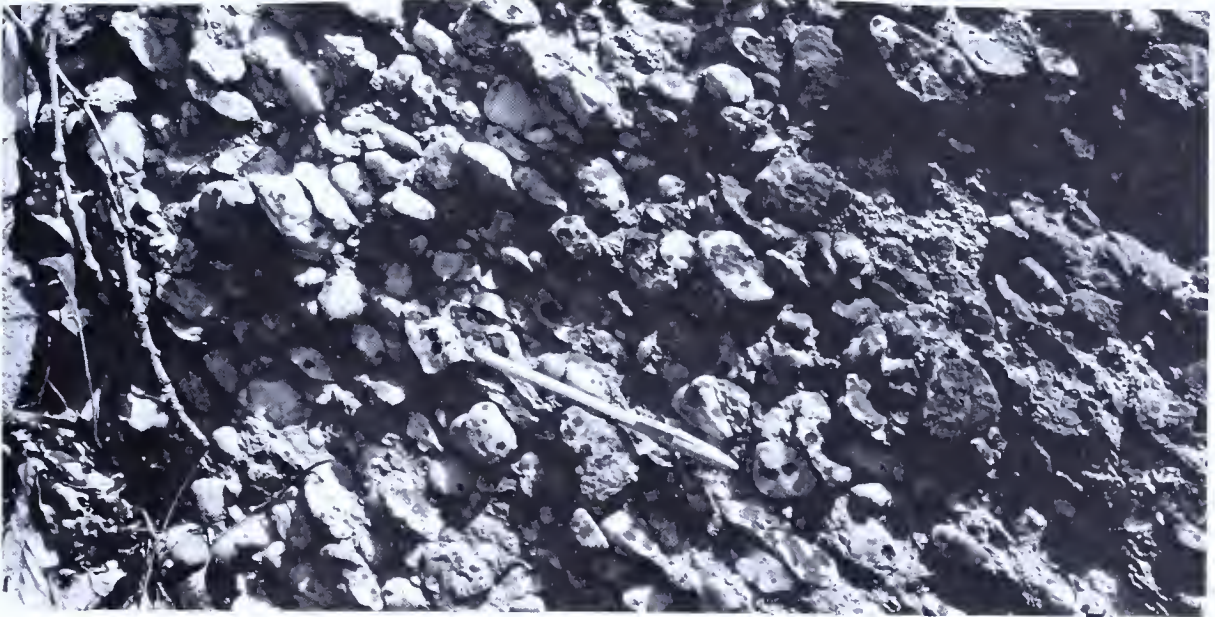
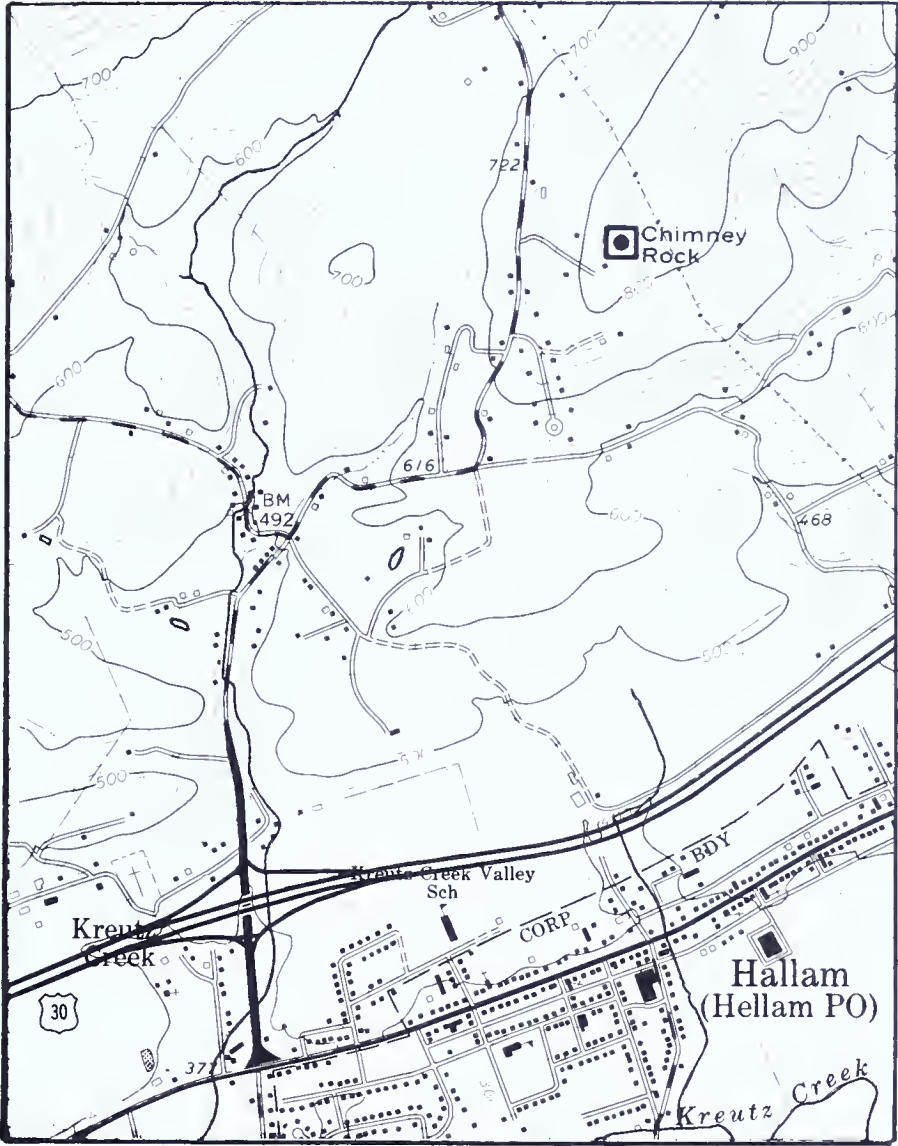
LOCATION: One mile north of Hellam Borough.

REMARKS: The highest point on a ridge of the Hellam Conglomerate Member of the Chickies Formation (Early Cambrian age); the oldest sedimentary rock in Pennsylvania. The conglomerate has weathered into spectacular pinnacles that stand 30 feet above the crest of the ridge.

REFERENCE: Stose, G. W., and Jonas, A. I. (1939), *Geology and mineral resources of York County, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., County Report 67, 199 p.



PIEDMONT PROVINCE
PIEDMONT UPLANDS SECTION



355. CONOWINGO ISLANDS

COUNTIES: Lancaster
and York

TOWNSHIPS: Martic and Drumore
(Lancaster County);
Lower Chanceford
(York County)

QUADRANGLE: Holtwood

LOCATION: South of the Holtwood Dam on the lower Susquehanna River; south of the Pa. Route 372 bridge.

REMARKS: South of the Holtwood Dam there are over 60 islands. In contrast to the others in the river, which are alluvial in nature, the Conowingo Islands are erosional remnants of the metamorphic rocks (schists and gneisses) of southern Lancaster County. This group of islands represents one of the most scenic areas of the state. The larger islands are:

Upper Bear Island (356): the largest of the group and the most primitive; has ridges of bedrock.

Lower Bear Island (357): second in size; the northern third is very rocky and has sheer-walled old channels, and ponds and marshes.

Piney Island (358): the northernmost of the group and immediately south of the Holtwood Dam; about half of the island is exposed rock.

Brushy Island (359): this and the cluster of islands immediately west of Piney Island are aptly named; very brushy; contains large exposures of Wissahickon Schist (Precambrian (?) age).

Peavine (360), **Wildcat** (361), and **Crow** (362) **Islands**: these islands and lesser ones total about 35 acres and are north and west of Upper Bear Island and immediately downstream from the Norman Wood Bridge; they are low, rocky islands.

Deepwater (363) and **Turkey** (364) **Islands**: two small areas east of the Bear Islands and very close to the York County shoreline.

Little Chestnut (365), **Wolf** (366), **Sicily** (367), and **Beach** (368) **Islands**: a scattered cluster near Big Chestnut and Hennery Islands; these small islands are especially scenic because of their spectacular high cliffs.

Mount Johnson Island (368): the southernmost island of the group; it towers 200 feet above the river and is very rugged.

PIEDMONT PROVINCE
PIEDMONT UPLANDS SECTION



370. COUNSELMAN RUN AREA

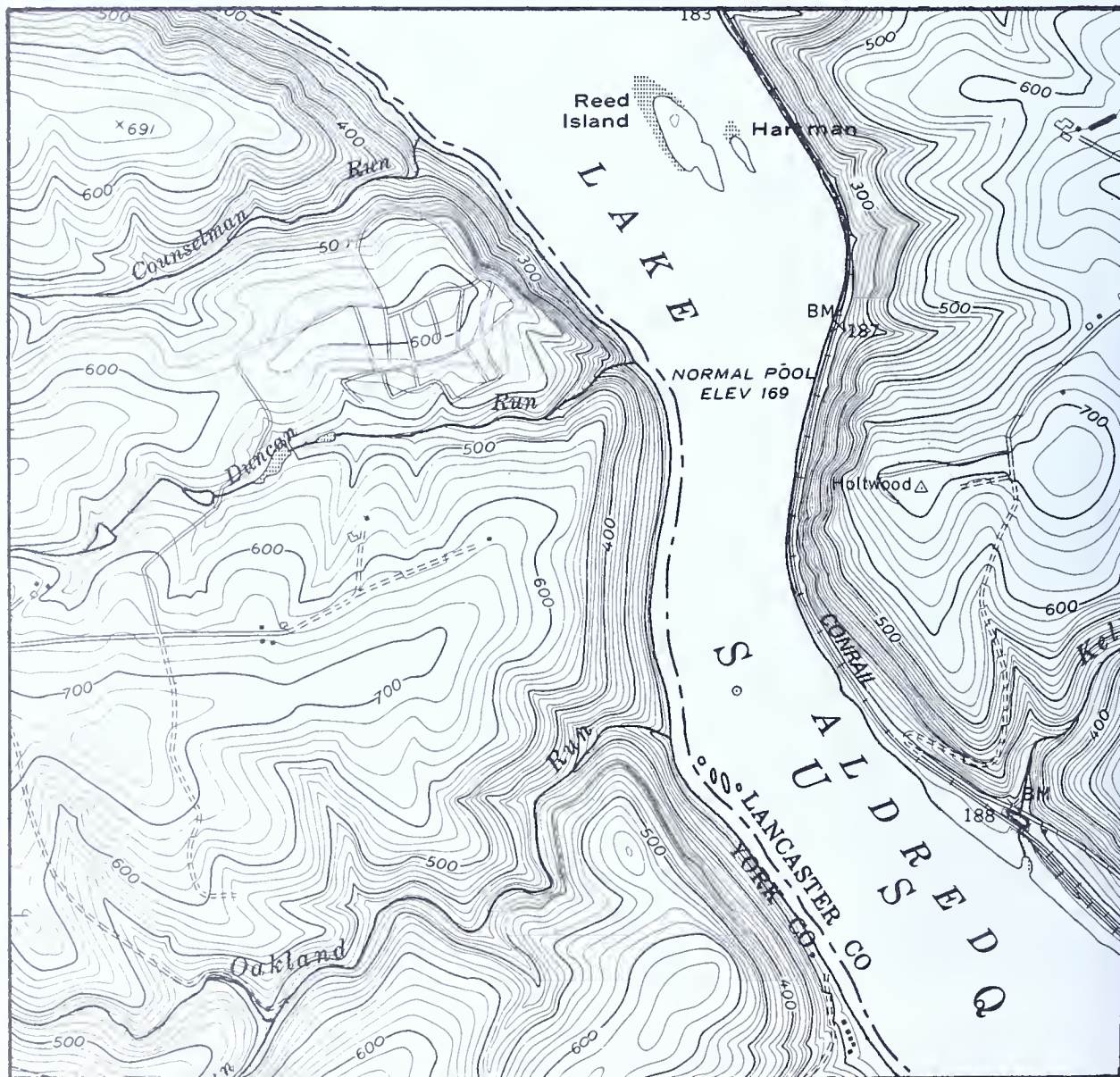
COUNTY: York

TOWNSHIP: Lower Chanceford

QUADRANGLE: Holtwood

LOCATION: One mile northwest of Holtwood, along the Susquehanna River.

REMARKS: This area is limited to the steep west wall of the Susquehanna River north of the Holtwood Dam. There are scenic waterfalls on Counselman Run, Duncan Run, and Oakland Run, all tributaries of the Susquehanna.



PIEDMONT PROVINCE
PIEDMONT UPLANDS SECTION



371. FACE ROCK OVERLOOK

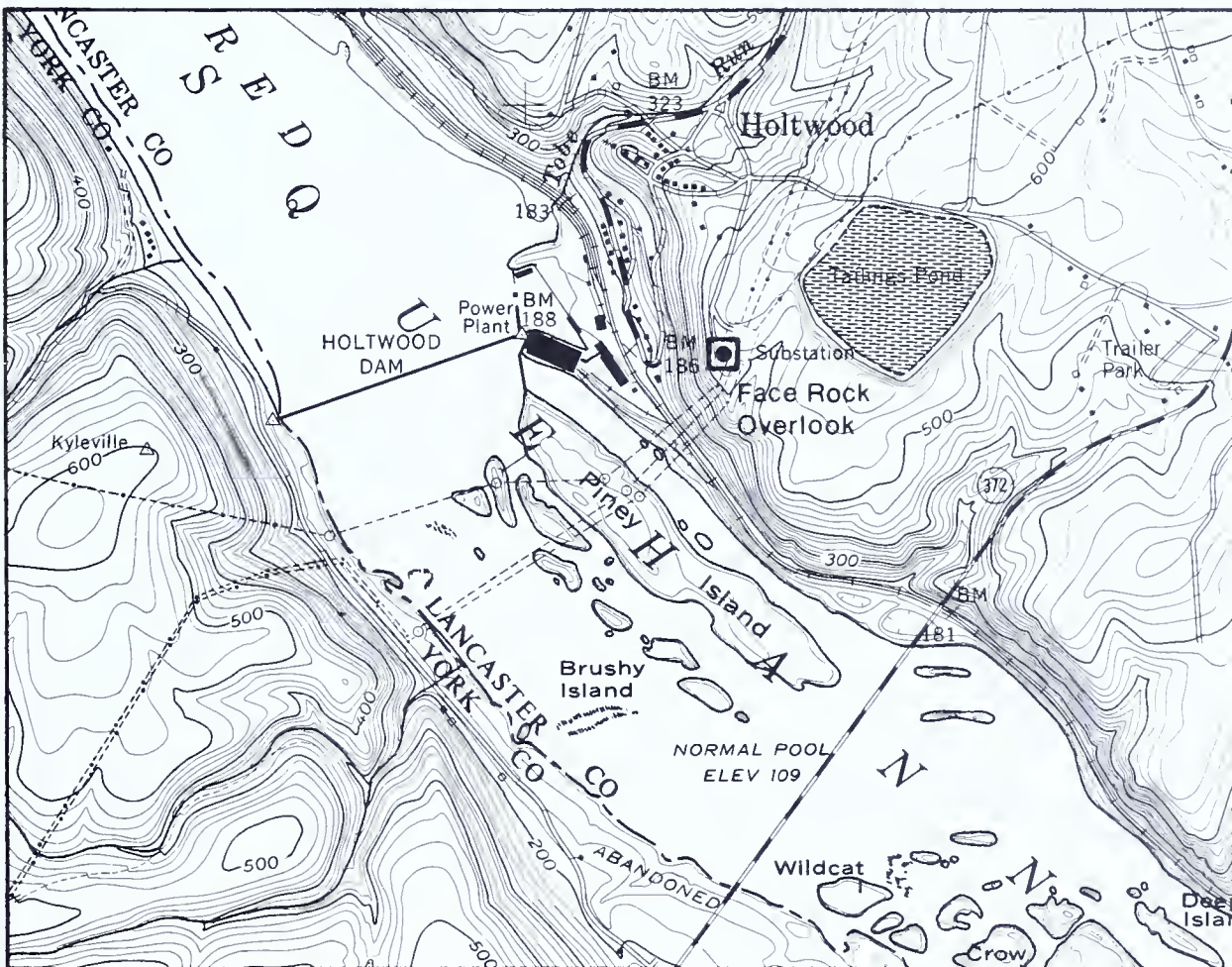
COUNTY: Lancaster

TOWNSHIP: Martic

QUADRANGLE: Holtwood

LOCATION: An overlook maintained by the Pennsylvania Power and Light Company at the substation on the cliff above the dam.

REMARKS: Magnificent view of the Susquehanna River valley, in an area known as the "river hills." These "hills" are underlain by schists of the Wissahickon Formation (Precambrian(?) age). Piney Island, one of the Conowingo Islands, lies directly below the overlook. An actual topographic cliff of schist known as **Face Rock** (372) is approximately 1.6 miles south of this overlook.



371. FACE ROCK OVERLOOK (*continued*)



PINEY ISLAND

PIEDMONT PROVINCE

PIEDMONT UPLANDS SECTION



373. HIGH ROCK

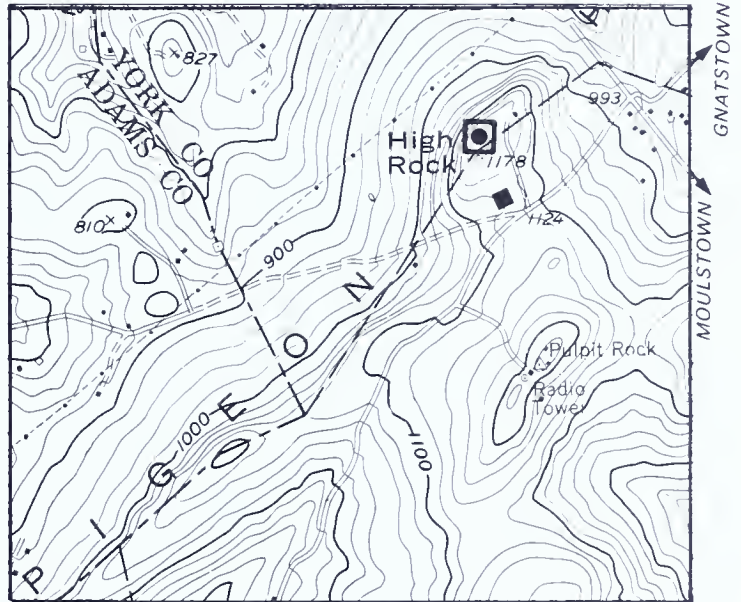
COUNTY: York

TOWNSHIP: Paradise

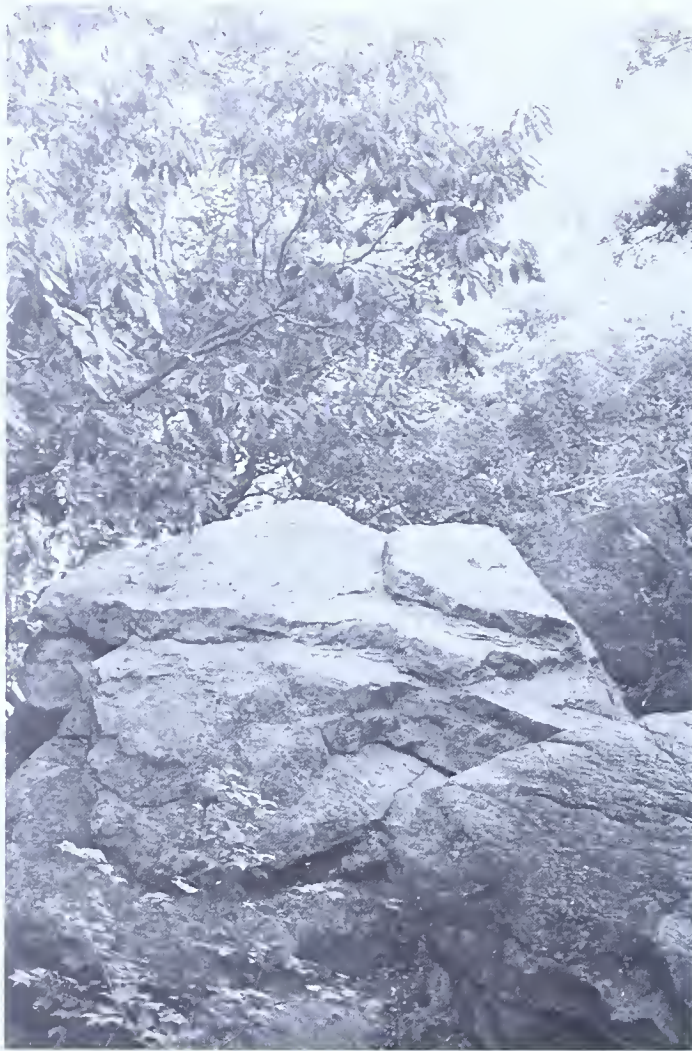
QUADRANGLE: Hanover

LOCATION: Approximately 4.7 miles north of the Hanover Borough square; along the north rim of the Pigeon Hills.

REMARKS: Outcrops of Lower Cambrian Chickies Quartzite on the Pigeon Hills; an excellent north overlook across the Piedmont Uplands; the Blue Ridge province is in the background. Trails through the pines and rock outcrops are extremely scenic.



373. **HIGH ROCK** (*continued*)



PIEDMONT PROVINCE
PIEDMONT UPLANDS SECTION



374. KELLYS RUN GORGE

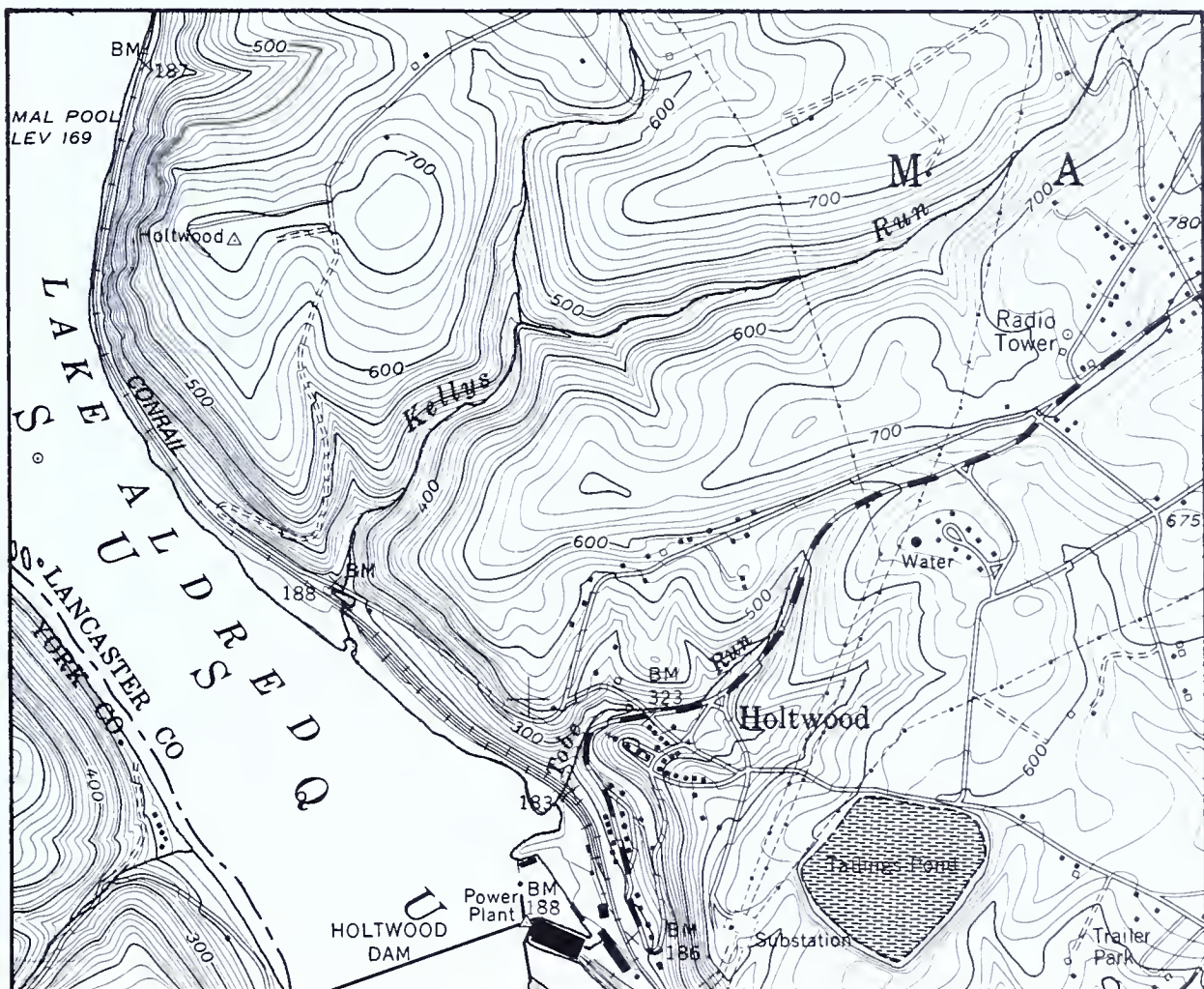
COUNTY: Lancaster

TOWNSHIP: Martic

QUADRANGLE: Holtwood

LOCATION: Approximately 0.75 mile north of Holtwood.

REMARKS: Kellys Run flows through a very wild and rocky gorge in the Wissahickon Schist (Precambrian(?) age). Sheer, vertical rock walls occur through the gorge.



374. KELLYS RUN GORGE (*continued*)





375. MARSH CREEK BOG

COUNTY: Chester

TOWNSHIP: East Nantmeal

QUADRANGLES: Wagontown and Elverson

LOCATION: Seven and five-tenths miles west of the Pennsylvania Turnpike, interchange 23 (Downingtown); along Marsh Creek approximately 4.0 miles southeast of Elverson.

REMARKS: Bogs are uncommon in southeastern Pennsylvania. This one on Marsh Creek is the finest example in this part of the state. The site is famous for the pollen and C-14 studies conducted here; it is a key site for evaluating the biological and geological prehistory of the state.

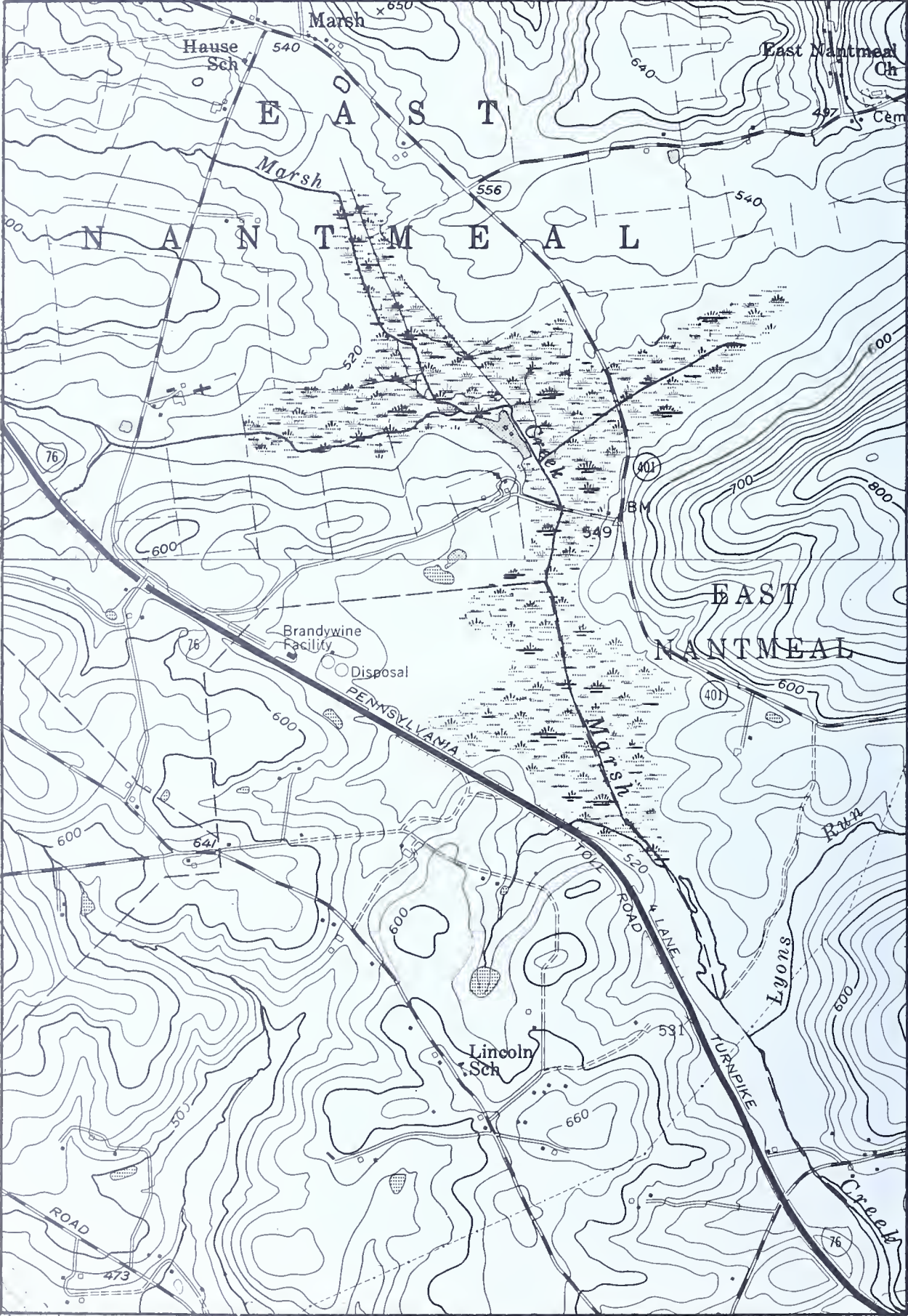
REFERENCES: Bricker, O. P., and Moss, J. H. (1958), *Origin of The Marsh, East Nantmeal Township, Chester County, Pennsylvania*, Pennsylvania Academy of Science, Proceedings, v. 32, p. 168-171.

Deevey, E. S., Jr., Gralenski, L. J., and Hofren, V. (1959), *Yale natural radiocarbon measurements, Part 4*, American Journal of Science Radiocarbon Supplement, v. 1, p. 144-172.

Martin, P. S. (1958), *Taiga-tundra and the full-glacial period in Chester County, Pennsylvania*, American Journal of Science, v. 256, p. 470-502.



375. MARSH CREEK BOG (continued)



PIEDMONT PROVINCE
PIEDMONT UPLANDS SECTION



376. MT. PISGAH

COUNTY: York

TOWNSHIP: Windsor

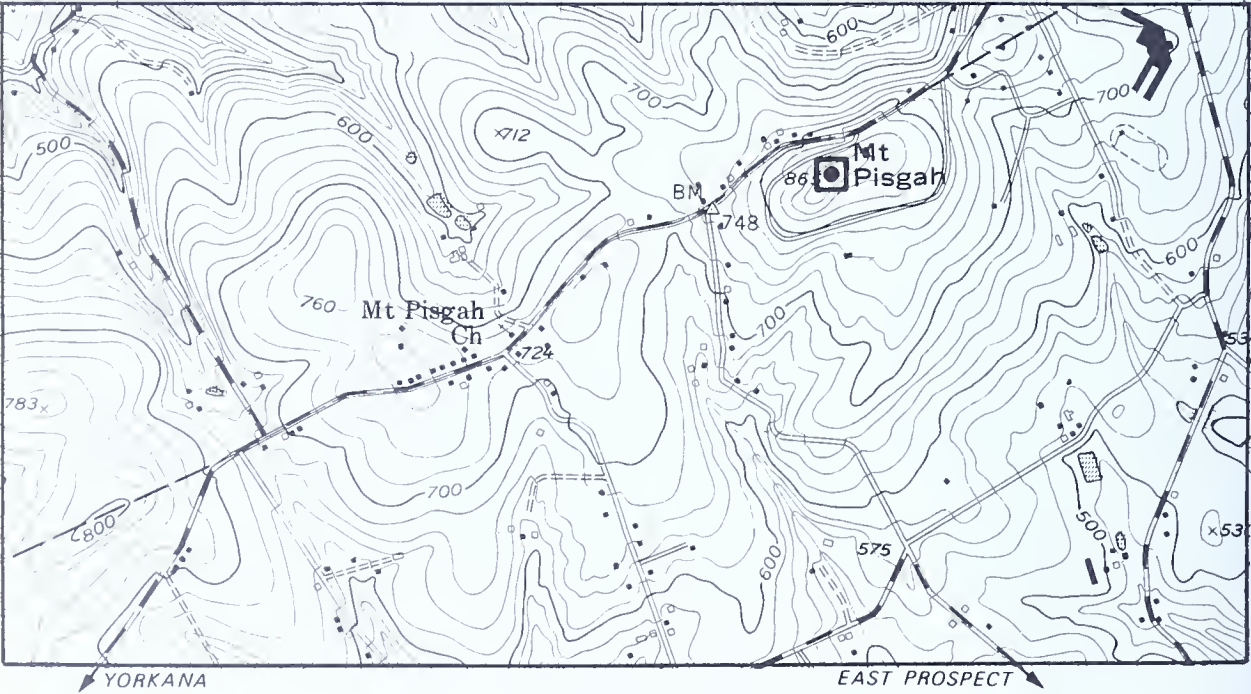
QUADRANGLE: Red Lion

LOCATION: Samuel E. Lewis State Park, approximately 2.25 miles northwest of the Borough of East Prospect.

REMARKS: Fantastic 12-mile view of the Susquehanna River valley to the Safe Harbor Dam; there is a view of the Chickies Rock anticline to the north. The site, which is 865 feet in elevation, is one of the highest in the area.



376. MOUNT PISGAH (continued)



PIEDMONT PROVINCE
PIEDMONT UPLANDS SECTION



377. OTTER CREEK GORGE

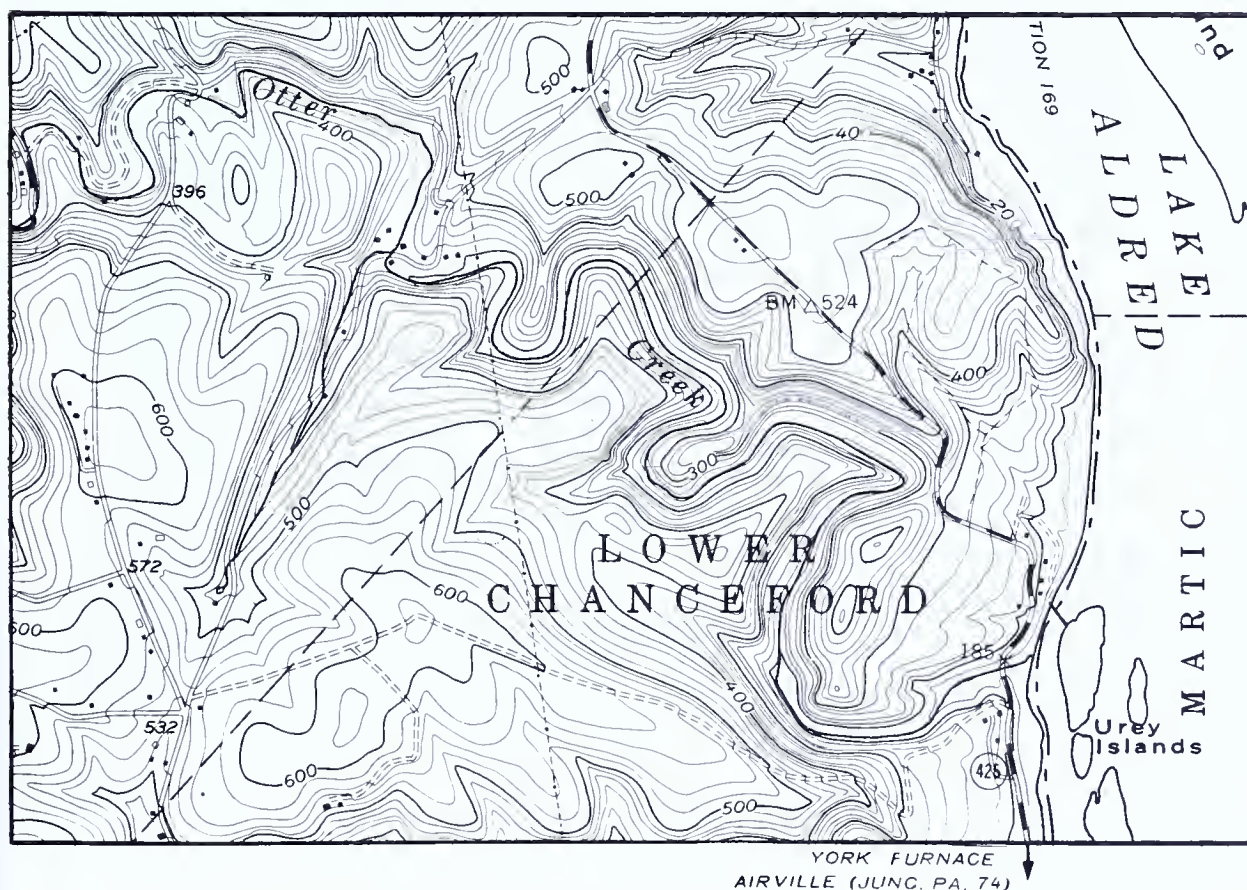
COUNTY: York

TOWNSHIP: Lower Chanceford

QUADRANGLE: Safe Harbor

LOCATION: One and four-tenths miles south of Shenks Ferry on the Susquehanna River, along Pa. Route 425. Part of the Otter Creek Gorge is included in the Pennsylvania Power and Light Company's Otter Creek Recreation Area located at the mouth of Otter Creek.

REMARKS: The extremely scenic ruggedness of the gorge makes this one of the outstanding natural areas in Pennsylvania. Outcrops of schist (Wissahickon Formation, Precambrian(?) age) line the walls of the gorge.



377. OTTER CREEK GORGE (*continued*)



PIEDMONT PROVINCE

PIEDMONT UPLANDS SECTION



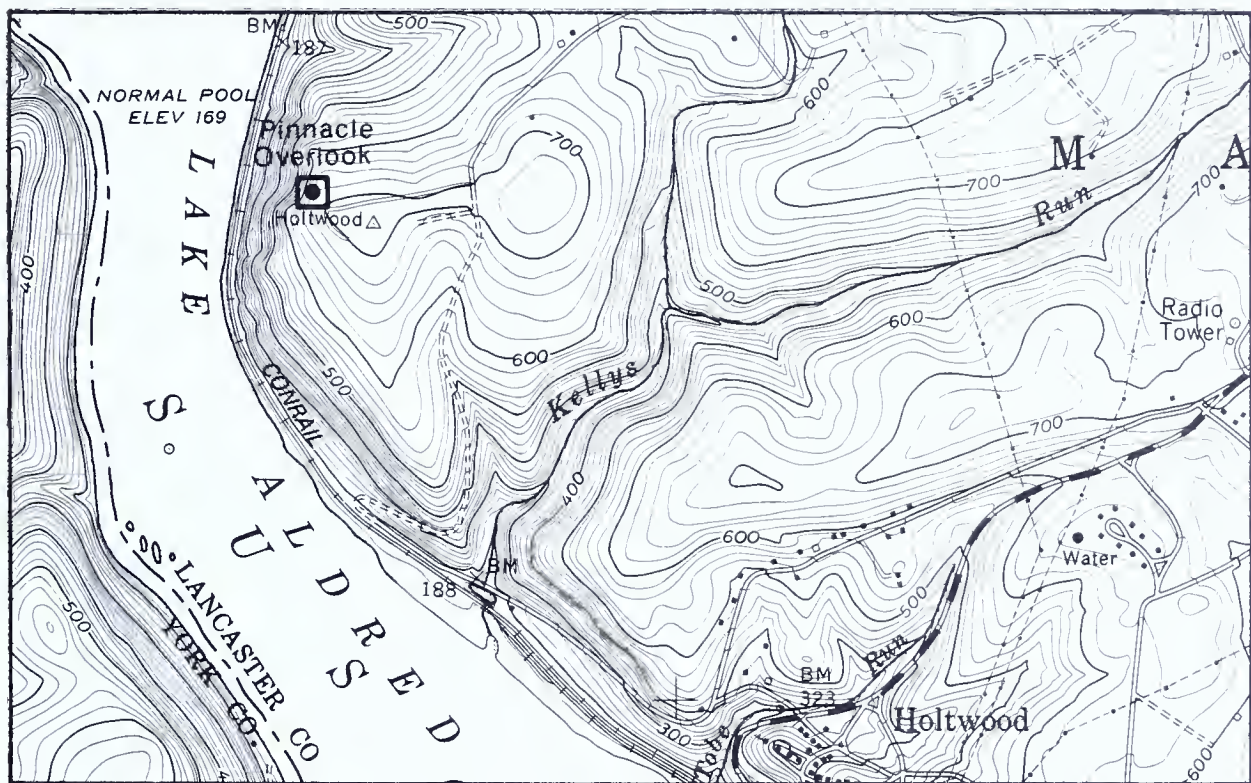
378. PINNACLE OVERLOOK

COUNTY: Lancaster

TOWNSHIP: Martic

QUADRANGLE: Holtwood

LOCATION: The overlook is included in the Pennsylvania Power and Light Company's recreation area along the Susquehanna River; approximately 1.2 miles northwest of the village of Holtwood.



REMARKS:

An excellent view of the river to the north: islands, Lake Aldred, and the "river hills" in the Wissahickon Schist (Precambrian(?) age). A plaque at the site reads: "In 68 miles the Susquehanna River falls 295 feet."



379. PORT KENNEDY CAVE

COUNTY: Montgomery

TOWNSHIP: Upper Merion

QUADRANGLE: Valley Forge

LOCATION: In a quarry 800 feet west of the village of Port Kennedy.

REMARKS: When this cave was first discovered it contained many Pleistocene fossils, including mammoth bones. Today the cave is filled and closed. It is considered to be one of the richest animal-remain sites in the state. A mastodon, two species of saber-toothed tigers, three pecaries, a tapir, and a huge bear were among the 41 species found.



PIEDMONT PROVINCE
PIEDMONT UPLANDS SECTION



- REFERENCES: Gilmore, C. W. (1938), *Fossil snakes of North America*, Geological Society of America Special Paper 9, 96 p.
- Lesley, J. P., editor (1883), *The geology of Chester County*, Pennsylvania Geological Survey, 2nd ser., Report C4, p. 187.
- Wheatley, C. M. (1871), *Notice of the discovery of a cave in eastern Pennsylvania, containing remains of post-Pliocene fossils*, American Journal of Science, 3rd ser., v. 1, no. 4, p. 235-237.

NOTES:

380. PULPIT ROCK

COUNTY: York

TOWNSHIP: Heidelberg

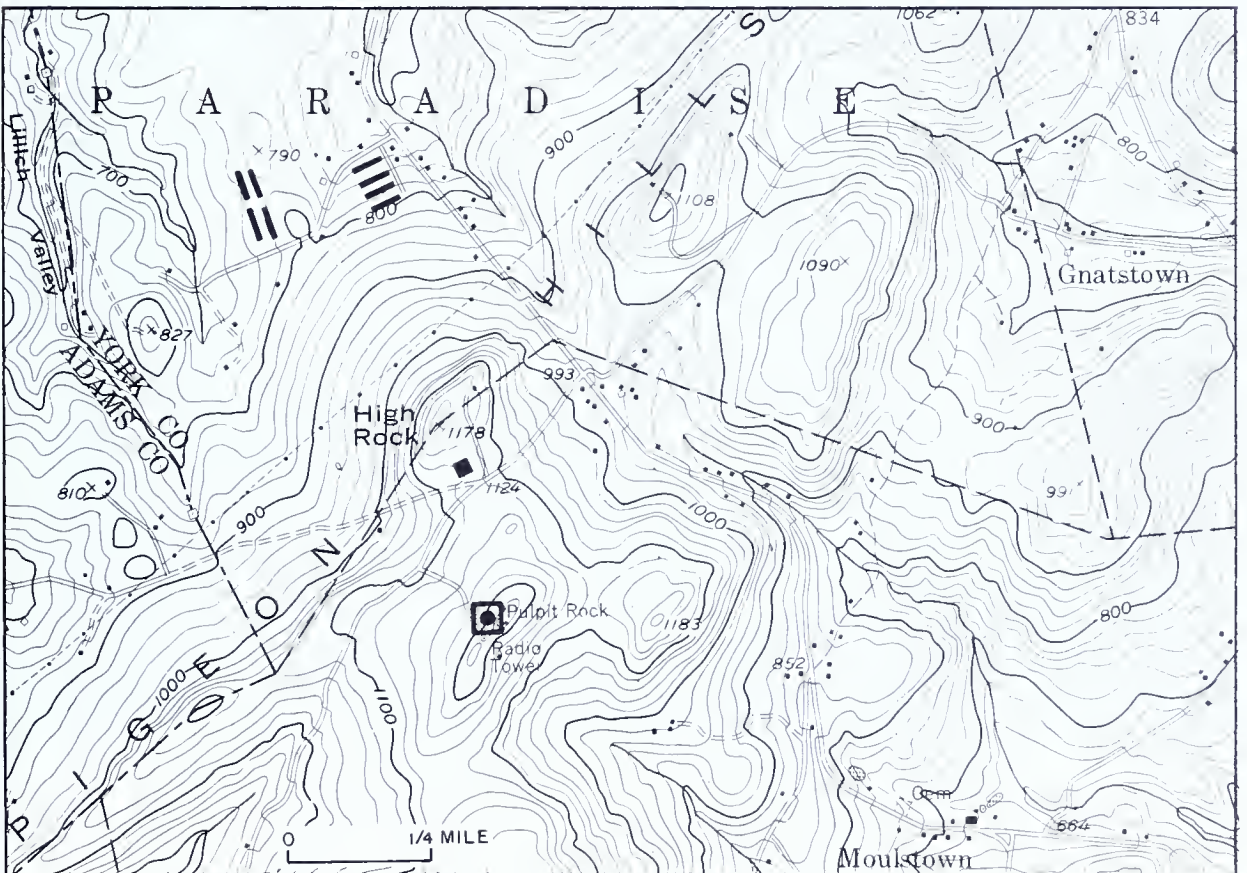
QUADRANGLE: Hanover

LOCATION: Approximately 4.4 miles north of Hanover; along the south rim of the Pigeon Hills.

REMARKS: Outcrops of Lower Cambrian Chickies Quartzite on the Pigeon Hills; provides a southern overlook across the Piedmont province in winter, when there is no summer foliage. A U. S. Coast and Geodetic Survey trig-station bronze plaque (dated 1942) is atop Pulpit Rock; a U. S. Coast and Geodetic Survey trig-station is a first-order horizontal and vertical control point in the national topographic land survey.



PIEDMONT PROVINCE
PIEDMONT UPLANDS SECTION



381. SUSQUEHANNOCK OVERLOOK

COUNTY: Lancaster

TOWNSHIP: Drumore

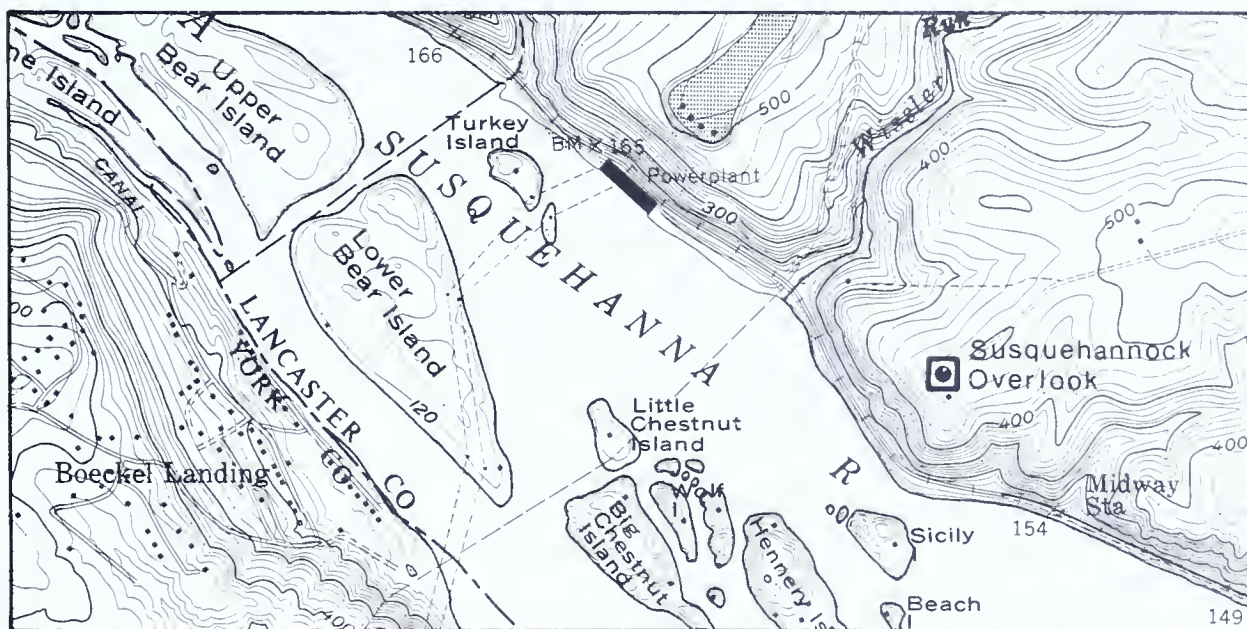
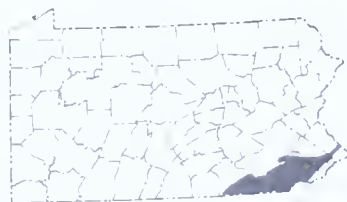
QUADRANGLE: Holtwood

LOCATION: Susquehannock State Park; approximately 3.0 miles south of the village of Holtwood along the Susquehanna River.

REMARKS: An excellent view of the Conowingo Islands in the Susquehanna from this pinnacle of Peters Creek Schist (Precambrian age). The northwest side of the park boundary follows Wissler Run and includes a very steep, rocky north slope (Peters Creek Schist). The three-unit facility of the Peach Bottom Nuclear Plant (one of the largest in the world) may be viewed from this site.



PIEDMONT PROVINCE
PIEDMONT UPLANDS SECTION



382. TUCQUAN GLEN

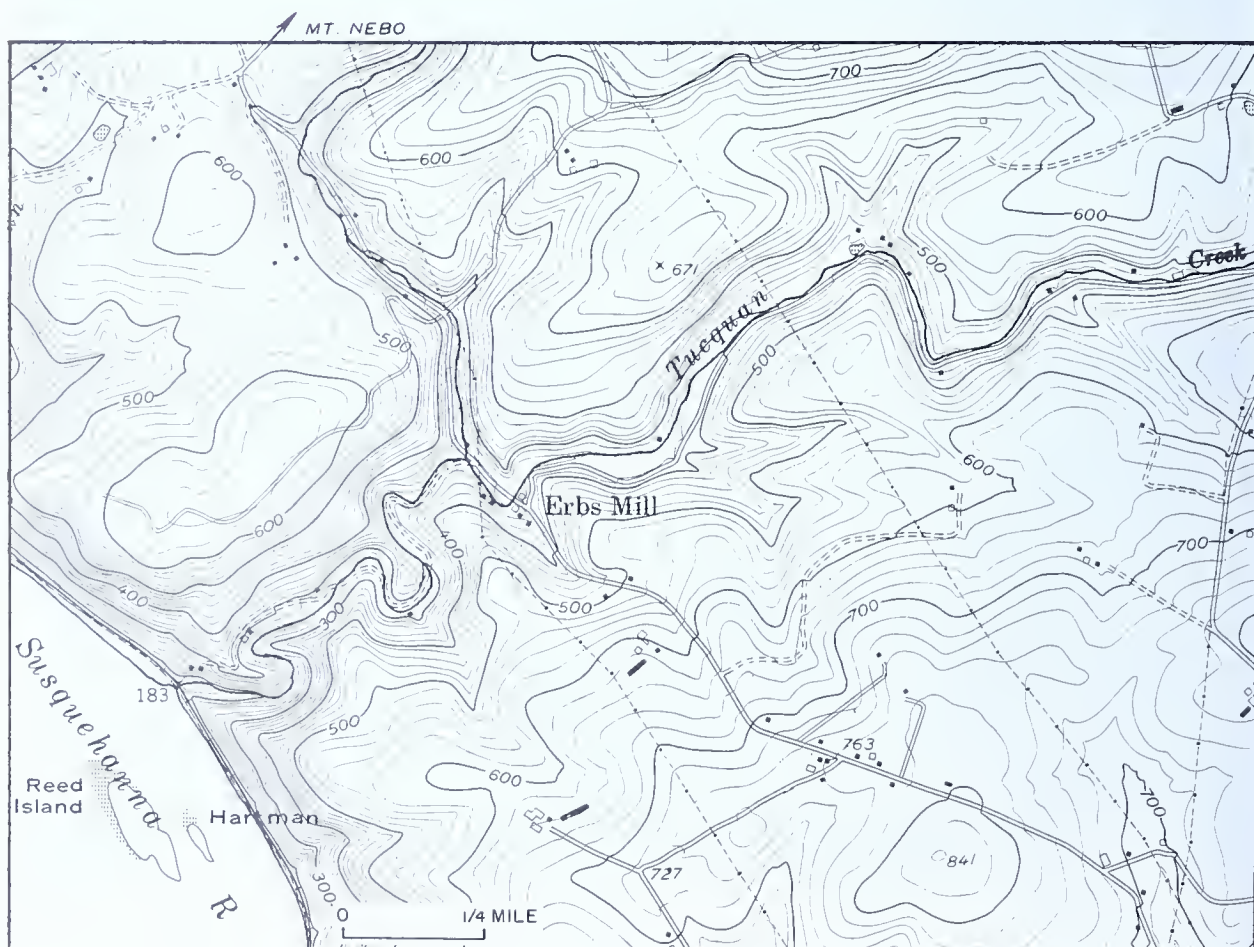
COUNTY: Lancaster

TOWNSHIP: Martic

QUADRANGLE: Holtwood

LOCATION: One mile southwest and northeast of Erbs Mill along Tucquan Creek.

REMARKS: An extremely scenic glen carved into the Wisahickon Schist (Precambrian(?) age); wild, wooded, and remote.



PIEDMONT PROVINCE
PIEDMONT UPLANDS SECTION



383. WILDCAT RUN GORGE

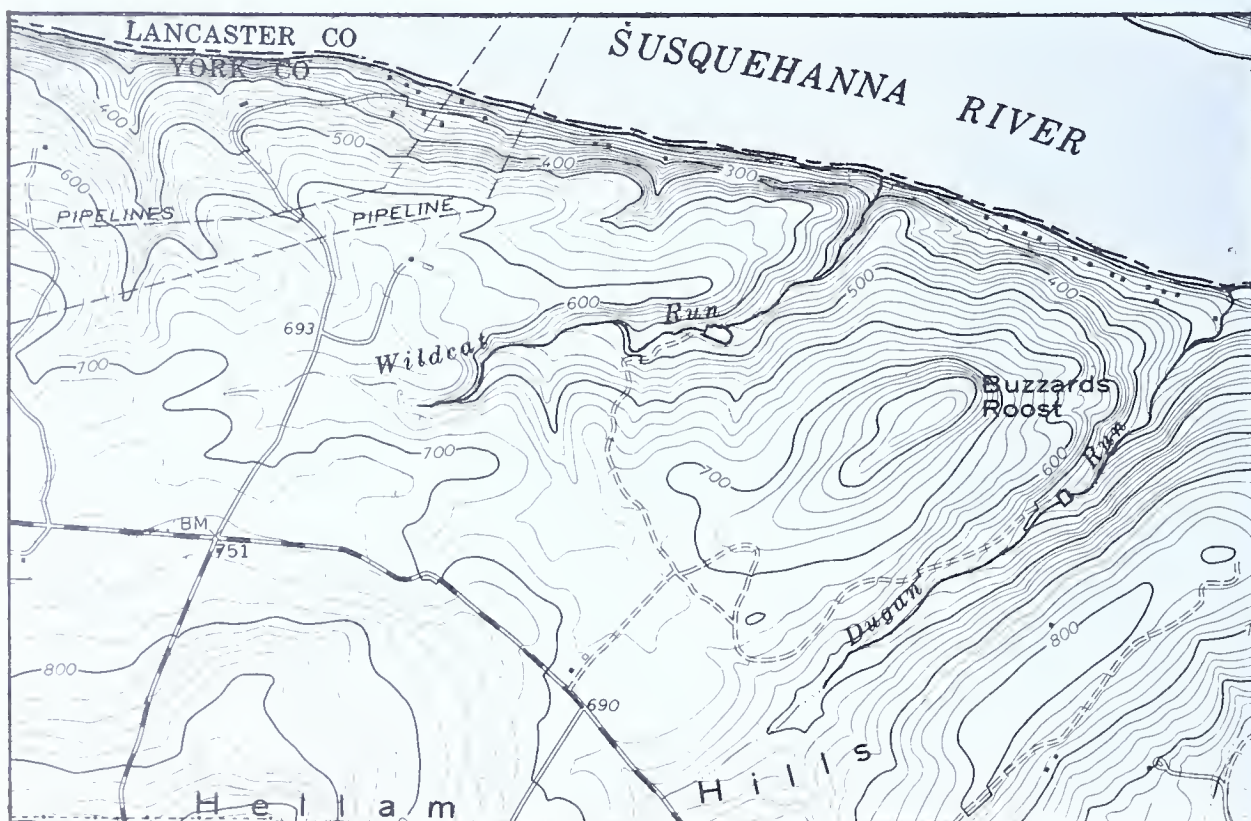
COUNTY: York

TOWNSHIP: Hellam

QUADRANGLE: Columbia West

LOCATION: Along the Susquehanna River on North River Road; 1.8 miles west of the village of Accomac.

REMARKS: A wild and scenic gorge on the north flank of the Hellam Hills. **Wildcat Falls** (384) is a spectacular feature within the gorge. Vertical cliffs up to 150 feet high of quartzite (Chickies Formation, Early Cambrian age) line the gorge and the Susquehanna River near the mouth of the run. **Round Top** (385), a prominent topographic feature located 2 miles to the east near **Hellam Point** (386), and **Schulls Rock** (387) located 2 miles to the west, are also underlain by this hard, weather-resistant quartzite. Schulls Rock and Wildcat Falls are two of the most scenic features in York County. Fossil animal trails or burrows called "scolithus tubes" are present in the Chickies Quartzite.



PIEDMONT PROVINCE
PIEDMONT UPLANDS SECTION



WILDCAT FALLS

REFERENCE: Stose, G. W., and Jonas, A. I. (1939), *Geology and mineral resources of York County, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., County Report 67, 199 p.

388. WOOD CHROMITE MINE

COUNTY: Lancaster

TOWNSHIP: Little Britain

QUADRANGLE: Rising Sun

LOCATION: Five tenths of a mile north of the Maryland-Pennsylvania boundary.

REMARKS: Chromite was mined here in the early 1800's. The Wood Mine was the largest and most famous of many chromite mines in southeastern Pennsylvania. This mine supplied nearly 100 percent of the world's chrome ore prior to the Civil War.

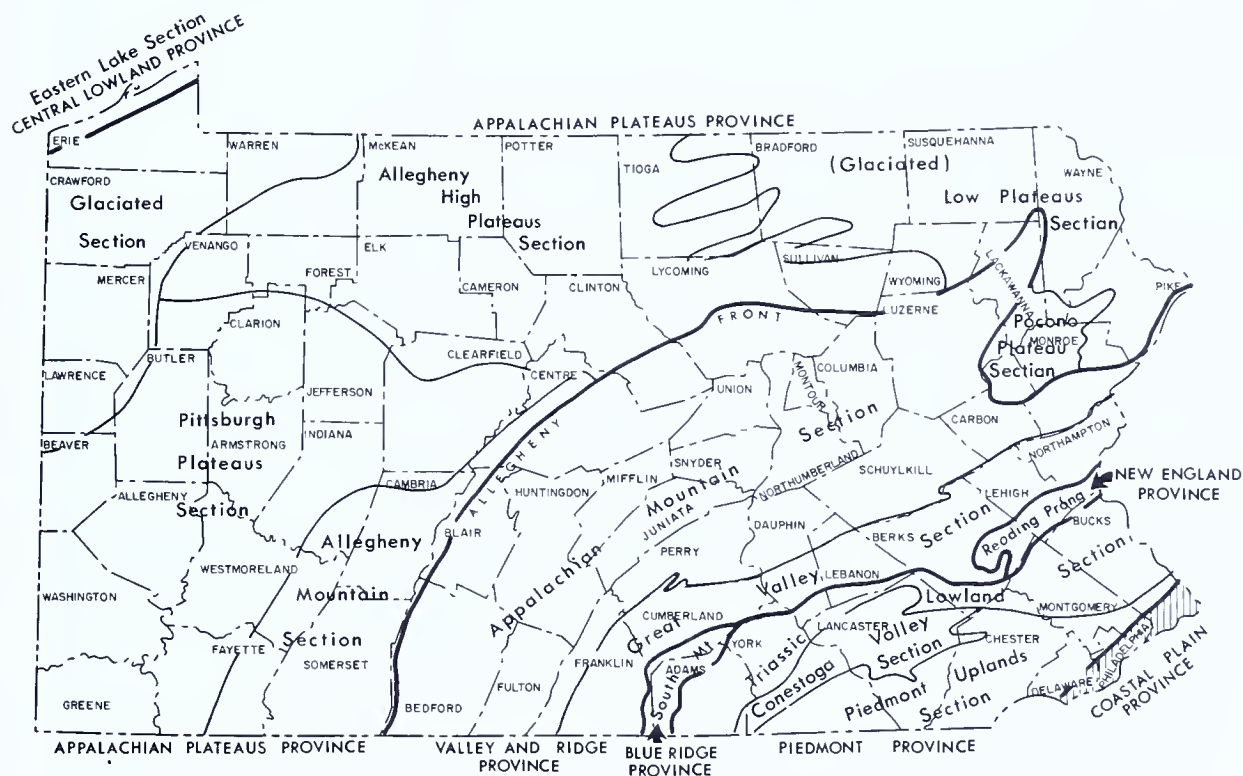
REFERENCES: Lapham, D. M. (1958), *Preliminary report on the chromite occurrence at the Wood mine, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Progress Report 153, 11 p.
Pearre, N. C., and Heyl, A. V. (1959), *The history of chromite mining in Pennsylvania and Maryland*, Pennsylvania Geological Survey, 4th ser., Information Circular 14, 27 p.



COASTAL PLAIN PROVINCE

TOPOGRAPHY

The Coastal Plain is bounded on the northwest by the Fall Line and is underlain by rocks of Quaternary age. The Fall Line is a line of contact between the unconsolidated rocks of the Coastal Plain and the consolidated rocks to the northwest. This "line" is marked by falls and rapids in the streams flowing to the Delaware River. The elevations of the land surface in this province range from sea level to about 60 feet above sea level. The land surface is low lying and gently rolling, and slopes gradually toward the Delaware River.



ROCK COLUMN

The Coastal Plain is underlain by unconsolidated, or poorly consolidated, beds of sand and gravel containing minor amounts of sandy clay, clay, and marl. These beds thicken southeastward and overlie the buried consolidated rocks that are at the surface in the Piedmont province.

A description of the rock units present follows:

SYSTEM	ROCK UNIT	DESCRIPTION
Quaternary	Cape May Formation	Sand and gravel and local clay; reaches a thickness of approximately 40 feet.
	Pensauken Formation	Sand and gravel; reaches a maximum thickness of about 70 feet.

ROCK STRUCTURE

The overall structure of the Coastal Plain is that of a homocline dipping gently to the southeast.

Several terraces exist along the Schuylkill River which record successive uplifts of the region. Although a long period of time has elapsed since these sediments were deposited, they have not been consolidated into solid rock except locally where some of the sands are cemented and form a very friable sandstone. At the mouth of the Schuylkill River these sands are apparently thicker than in the adjacent areas.





389. TINICUM MARSH

COUNTIES: Delaware
and Philadelphia

TOWNSHIP: Tinicum (Delaware
County)
CITY: Philadelphia

QUADRANGLES: Bridgeport and Lansdowne

LOCATION: Along Darby Creek at the southern city
boundary with Delaware County.

REMARKS: The largest saltwater marsh in Pennsylvania;
also a freshwater marsh and lake in the east
and northeast areas. The U. S. Fish and Wildlife
Service, Department of the Interior, owns and
operates the freshwater section. The Tinicum
Environmental Center is located south of 84th
Street along Darby Creek at the head of the
marsh; a registered National Natural Landmark.



389. TINICUM MARSH (continued)



THE DEVIL IN PENNSYLVANIA

Dr. Thomas R. Beveridge, a long-time friend, now deceased, published a very similar inventory of geologic features for the State of Missouri. While "Tom" was State Geologist of Missouri (1955-1964), we talked of a raft trip down the Missouri River, fishing for those giant catfish and geologizing as we drifted. His magnificent book reflects this and other similar trips he must have taken during those years. I wish I could have been along.

An intriguing chapter, titled "The Devil in Missouri," appears in his work. What "Tom" has found in Missouri is also true in Pennsylvania. His story follows, changed slightly to fit our Commonwealth.

Pioneer Pennsylvanians, largely of Scotch-Irish and German backgrounds, were preoccupied with the devil, largely a result of Calvinistic teachings. This devilish influence is in sharp contrast to the western United States, where the Latin-American settlers predominated and features named commonly alluded to angels and heaven.

The following list of over 30 geologic features named for this "fellow" has been compiled from published reports and topographic maps. It is definitely not complete but represents the majority of Pennsylvania's geologic features named for creations, haunts, and physical parts of the devil.

REFERENCE: Beveridge, T. R. (1978), *Geologic wonders and curiosities of Missouri*, Missouri Division of Geology and Land Survey, Educational Series No. 4, 451 p.

DEVILISH HAUNTS IN PENNSYLVANIA

NAME	LOCATION	TYPE OF FEATURE	REMARKS
Devil Alex Hollow	Franklin County	Stream valley	Scotland quadrangle
Devil Head	Berks County	Rock promontory	Manatawny quadrangle
Devils Backbone	Erie County	Ridge	Described on page 23
Devils Course	Dauphin County	Stream	Susquehanna River basin; Manada Gap quadrangle
Devils Den	Adams County	Erosional remnant	Described on page 412
Devils Den	Elk County	Rock promontory	Ridgway quadrangle
Devils Den	McKean County	Rock promontory	Described on page 76
Devils Den Cave	Adams County	Boulder cave	Reference (3), p. 11-12
Devils Den Cave	Westmoreland County	Sinkhole cave	Reference (4), p. 77
Devils Elbow	Centre County	Hill	Snow Shoe SE quadrangle
Devils Elbow	Clearfield County	Meander	Described on page 78
Devils Elbow	Tioga County	Stream valley	Morris quadrangle
Devils Elbow	Union County	Hill	Weikert quadrangle
Devils Feather Bed	Northumberland County	Stream valley	Riverside quadrangle
Devils Garden	Sullivan County	Weathered boulders	Described on page 79
Devils Hole	Elk County	Stream valley	Wildwood Fire Tower quadrangle
Devils Hole	Monroe County	Stream valley	Buck Hill Falls quadrangle
Devils Hole Rock Shelter	York County	Rock shelter	Reference (3), p. 93-95
Devils Hole Boulder Caves	Lancaster County	Boulder caves	Reference (3), p. 20-22
Devils Hole Creek	Monroe County	Stream	Delaware River basin; Buck Hill Falls quadrangle
Devils Hole Run	Columbia County	Stream	Susquehanna River basin; Benton quadrangle

Devils Hump	Berks County	Ridge	Described on page 399
Devils Potato Patch	Northampton County	Boulder field	Described on page 250
Devils Pulpit	Carbon County	Rock promontory	Reference (2), p. 70, 127, and 135
Devils Punchbowl	Susquehanna County	Plunge pool (glacial)	Described on page 169
Devils Racecourse	Dauphin County	Boulder field	Described on page 251
Devils Racecourse	Franklin County	Boulder field	Described on page 380
Devils Run	Clearfield County	Stream	Susquehanna River basin; Clearfield quadrangle
Devils Run	Franklin County	Stream	Potomac River basin; Blue Ridge Summit quadrangle
Devils Wall	Carbon County	Ridge	Also known as Stony Ridge; reference (1), p. 1061-1062; described on page 322
Hells Kitchen	Luzerne County	Stream valley on mountain slope and rock promontories	Described on page 265

REFERENCES:

- (1) Lesley, J. P. (1892), *A summary description of the geology of Pennsylvania*, Pennsylvania Geological Survey, 2nd ser., 1892 Summary Final Report, v. 2, p. 721-1628.
- (2) Miller, B. L., Fraser, D. M., Miller, R. L., and others (1941), *Lehigh County, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., County Report 39, 492 p.
- (3) Reich, J. R., Jr., compiler (1974), *Caves of southeastern Pennsylvania*, Pennsylvania Geological Survey, 4th ser., General Geology Report 65, 120 p.
- (4) White, W. B., editor (1976), *Caves of western Pennsylvania*, Pennsylvania Geological Survey, 4th ser., 97 p.

ACKNOWLEDGEMENTS

In the initial phase of compilation of this report, the authors contacted all the county and regional planning commissions, providing them with a questionnaire to be completed on what they considered to be the most outstanding geologic features in their area. The following were especially helpful and merit acknowledgement for contributions: Doug Blankinship, Lackawanna County Regional Planning Commission; Helen Breithaupt, Monroe County Planning Commission; John P. Davis, Crawford County Planning Commission; M. Donald Hughes, Susquehanna County Planning Commission; Michael N. Kaiser, Joint Planning Commission, Lehigh-Northampton Counties; Raymond Kerr, Bureau of Planning, City of Reading; Fred Lochner, Butler County Planning Commission; Donald J. Masisak, North Central Pennsylvania Regional Planning and Development Commission; J. Ross Pilling II, Chester County Planning Commission; John Schein, York County Planning Commission; Michael W. Wambaugh, Bedford County Planning Commission; and Westmoreland County, Department of Planning.

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GLOSSARY

Anticline. An upfold or arch in the rocks.

Anticlinorium. A major anticline or upfold composed of many smaller folds; an anticlinorium must be a large fold, several miles across.

Axial plane. An imaginary plane between the limbs of a fold that divides the fold as symmetrically as possible.

Axis. The intersection of the axial plane with the ground surface.

Bed. A layer of rock bounded at the top and bottom by planes of separation, or a layer of relatively uniform rock bounded by layers (beds) of recognizably different rocks. The thickness of a single bed may range from paper thinness to tens of feet. Note: At the time of deposition, beds normally have nearly horizontal attitudes, and younger beds are deposited on older beds. The present attitude of beds is therefore an indication of their deformation since deposition. Extreme deformation may lead to inverted sequences in which older beds lie on younger beds.

Bedding. In geology, the physical separation within sedimentary rocks along planes of stratification dividing rocks of similar or different lithologies.

Bedding plane. Not a true plane, but a more or less regular surface of separation between adjacent layers of rock. Note: Features of the rock, such as color banding, lamination, and shaly partings, which are parallel to the bedding planes, are commonly referred to as bedding.

Breccia. A rock made up of highly angular, coarse fragments; may be indicative of the presence of a fault or of sedimentary fragments not rounded by transportation.

Cleavage. The ability of rocks to split along parallel surfaces of secondary origin.

Cleavage plane. A plane, of secondary origin, along which a rock cleaves.

Conglomerate. A cemented clastic rock containing rounded fragments corresponding in their grain sizes to gravel or pebbles.

Contact. A more or less regular surface where two formations are in contact with each other.

Crest. The top line of a mountain or hill.

Cross fault. See *Fault*.

Diabase. A dark-gray igneous rock composed of labradorite crystals partly included in pyroxene grains. Diabase forms if the magma cools beneath the earth's surface, and tends to be medium grained. Basalt, which has the same composition as diabase, forms if the same magma cools on the earth's surface; it is usually fine grained.

Dip. The angle of inclination of a bed, joint, contact, fault, etc., measured from the horizontal. The dip is the maximum angle of slope of a given plane and is measured between that plane and the horizontal in a position perpendicular to the strike; see *Strike*.

Disconformity. See *Unconformity*.

Dolomite. The accepted name for a rock containing a significant quantity (over 50 percent) of the mineral dolomite, which is a carbonate of calcium and magnesium, $\text{CaMg}(\text{CO}_3)$.

Drag fold. See *Fold*.

Fault. A break in the continuity of a body of rock attended by movement on one or both sides of the break (the fault surface). The amount of displacement may be a few inches or thousands of feet. Faults are classified both as to type of movement and orientation with respect to the bedding.

Strike fault. A fault striking nearly parallel to the strike of the sediments cut by the fault.

Cross fault. A fault striking perpendicular to, or at a high angle to, the strike of the sediments cut by the fault.

Tear fault. A cross fault along which displacement has been parallel to the strike of the fault.

Normal fault. A fault in which the hanging wall has apparently moved downward relative to the footwall.

Reverse fault. A fault in which the hanging wall has apparently moved upward relative to the footwall.

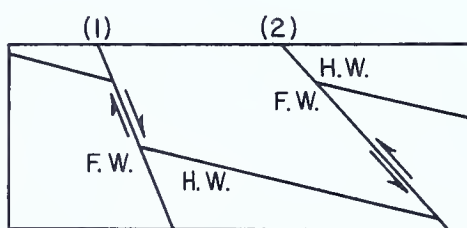


Figure 1. Diagrammatic cross section of normal and reverse faults offsetting a key bed. (1) Normal fault; (2) reverse fault. H. W., hanging wall; F. W., foot wall.¹

Stretch fault. A thrust fault that occurs when the inverted limb of an overturned fold becomes so stretched that it finally ruptures (see *Recumbent fold*).

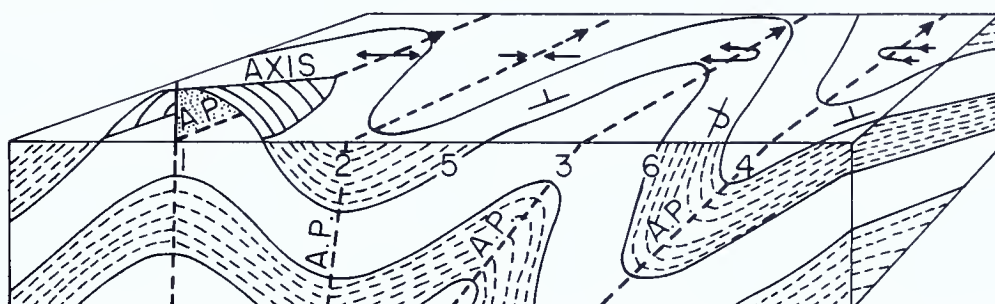
Thrust fault. A reverse fault; in common usage, a reverse fault having a low dip.

¹ All figures in the glossary are from Gray, Carlyle (1952), *The high calcium limestones of the Annville belt in Lebanon and Berks Counties, Pennsylvania*, Pennsylvania Geological Survey, 4th ser., Progress Report 140, 17 p.

Fold. A bend in a surface or layer.

Anticline. An upfold or arch in the rock; may be small (inches) or large (thousands of feet).

Axial plane. An imaginary plane that divides a fold as symmetrically as possible.



NOMENCLATURE

MAP SYMBOLS

A.P. Axial plane

1 Anticline

2 Syncline

3 Overturned anticline

4 Overturned syncline

5 Normal limb

6 Overturned limb

↗ Dip and strike,
normal beds

↘ Dip and strike,
overturned beds

↗↘ Axis of anticline,
arrow indicates
direction of plunge

↗↘ Axis of syncline

↗↘ Axis of overturned
anticline

↗↘ Axis of overturned
syncline

Figure 2. Fold nomenclature.

Axis. The intersection of the axial plane with a particular bed or the surface of the ground.

Crest. The line of highest elevation on any bed in an anticline.

Drag folds. Folds produced in an incompetent (soft) bed by relative movement of two enclosing, more competent (stiff) beds in opposite directions with respect to one another (see Figure 3). Drag folds are usually of small size, a fraction of an inch to a few feet in amplitude. The term is also used in reference to larger folds formed by similar relative movement of enclosing rocks, as in an anticlinorium or overthrusting. Note in Figure 3, showing the relationship of drag folds to regional folding, that the axial planes of the drag folds are roughly parallel to the slaty cleavage. This relationship is useful in determining the top and bottom of beds. See *Cleavage*.

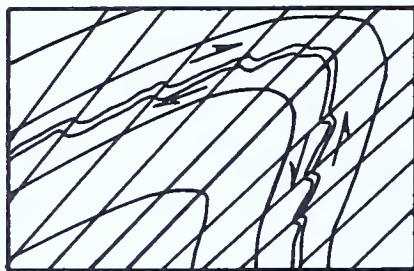


Figure 3. Diagram showing the relationship of axial-plane cleavage to bedding in an overturned fold. Also indicated are drag folds in an incompetent bed. Note that the axial planes of the drag folds are approximately parallel to the cleavage.

Isoclinal fold. A fold in which the two limbs dip at equal angles in the same direction; i.e., the limbs are parallel, or nearly so.

Overturned fold. One in which the axial plane is inclined, and both limbs dip in the same direction, usually at different angles. One limb is right side up, whereas the other limb has been rotated more than 90 degrees and is upside down.

Plunge. The inclination of the axis of a fold as measured in a vertical plane containing the axis.

Recumbent fold. An overturned fold in which the axial plane is essentially horizontal; special terminology used in referring to recumbent folds is illustrated in Figure 4.

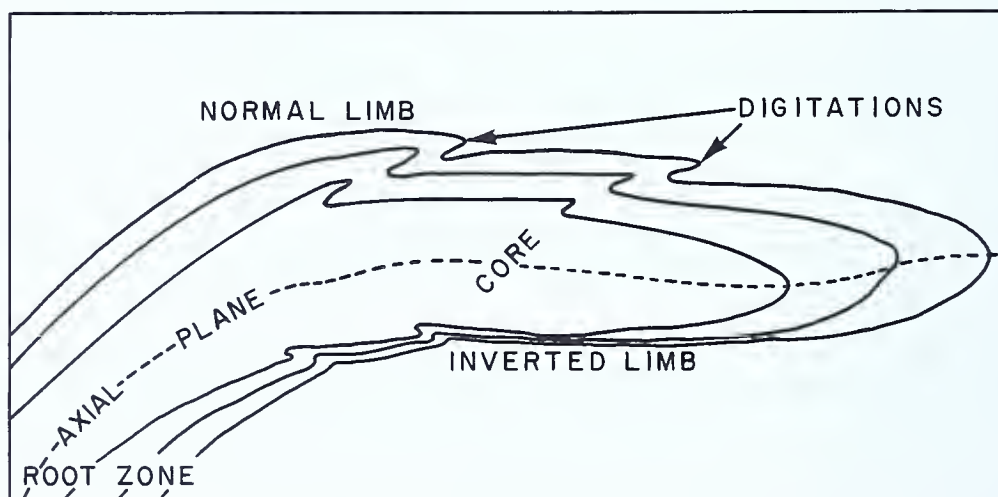


Figure 4. Nomenclature of recumbent folds.

Syncline. A downfold, or structural trough in the rock layers.

Formation. A mappable layer or group of layers; the basic unit in geologic mapping; a formation must have recognizable contacts which are capable of being traced in the field, and it must be large enough to be shown on a map.

GLOSSARY

Fracture. A break in a rock caused by stresses.

Gneiss. A metamorphic rock in which bands of light-colored quartz and/or feldspar alternate with bands of dark-colored minerals.

Igneous. Rock formed from the solidification of magma.

Intrusion. A body of igneous (molten) rock that invades older rock.

Isoclinal fold. See *Fold*.

Joint. A fracture or break in a rock along which no movement has taken place (compare *Fault*).

Leaching. The differential removal of more soluble materials by the action of dissolving liquids; limestones are leached by groundwater, or even surface waters, especially those containing high concentrations of naturally occurring carbonic acid.

Limestone. A sedimentary rock composed predominantly of calcium carbonate (CaCO_3); other minor constituents may include the mineral dolomite, clay, silica, and, less abundantly, iron carbonate and sulfides.

Impure limestone. Contains more than 5 percent of insoluble impurities.

Pure limestone. Contains less than 5 percent insoluble impurities, and less than 10 percent MgCO_3 .

High-calcium limestone. Contains over 95 percent CaCO_3 .

Magnesian limestone. Contains 10 to 30 percent MgCO_3 .

Lithology. The compositional description of rocks.

Mantle. The layer of loose, incoherent rock material, of whatever origin, that nearly everywhere forms the surface of the land and rests on hard bedrock; it comprises rock waste of all sorts, volcanic ash, glacial drift, alluvium, wind-blown deposits, vegetal accumulations, and soils.

Metamorphic rock. Rock formed by the conversion of older igneous, sedimentary, or metamorphic rock in response to a change in temperature and/or pressure.

Normal fault. See *Fault*.

Overtured fold. See *Fold*.

Plunge. See *Fold*.

Recumbent fold. See *Fold*.

Reverse fault. See *Fault*.

Sandstone. A clastic sedimentary rock composed of mineral grains 0.2 to 2.0 millimeters in diameter.

Schist. A metamorphic rock that is foliated and splits into thin, irregular plates.

Sedimentary rock. Rock formed from the consolidation of loose sediment by cementation or compaction.

Shale. A laminated sediment, in which the constituent particles are predominantly of the clay grain size; has fissility that is approximately parallel to bedding.

Shear zone. A zone in which the rock is crushed and brecciated as the result of movement on innumerable, closely spaced, more or less parallel fractures.

Stratigraphy. The study of rock strata, the conditions of their deposition, and their character, age sequence, and distribution.

Strike. The direction (azimuth) of a line formed by the intersection of an inclined surface (e.g., bedding, joint surface) and a horizontal plane. Compare *Dip*.

Structure. The configuration of rock formations as emplaced or as modified by folding, faulting, and the like.

Syncline. See *Fold*.

Tear fault. See *Fault*.

Thrust fault. See *Fault*.

Unconformity. A buried erosion surface; to form an unconformity requires a reversal of the condition of erosion and sedimentation; an area once eroded becomes one of sedimentation; the surface separating the newly deposited rocks from the underlying, partly eroded rocks is an unconformity. A disconformity is an unconformity between formations whose bedding is nearly parallel.

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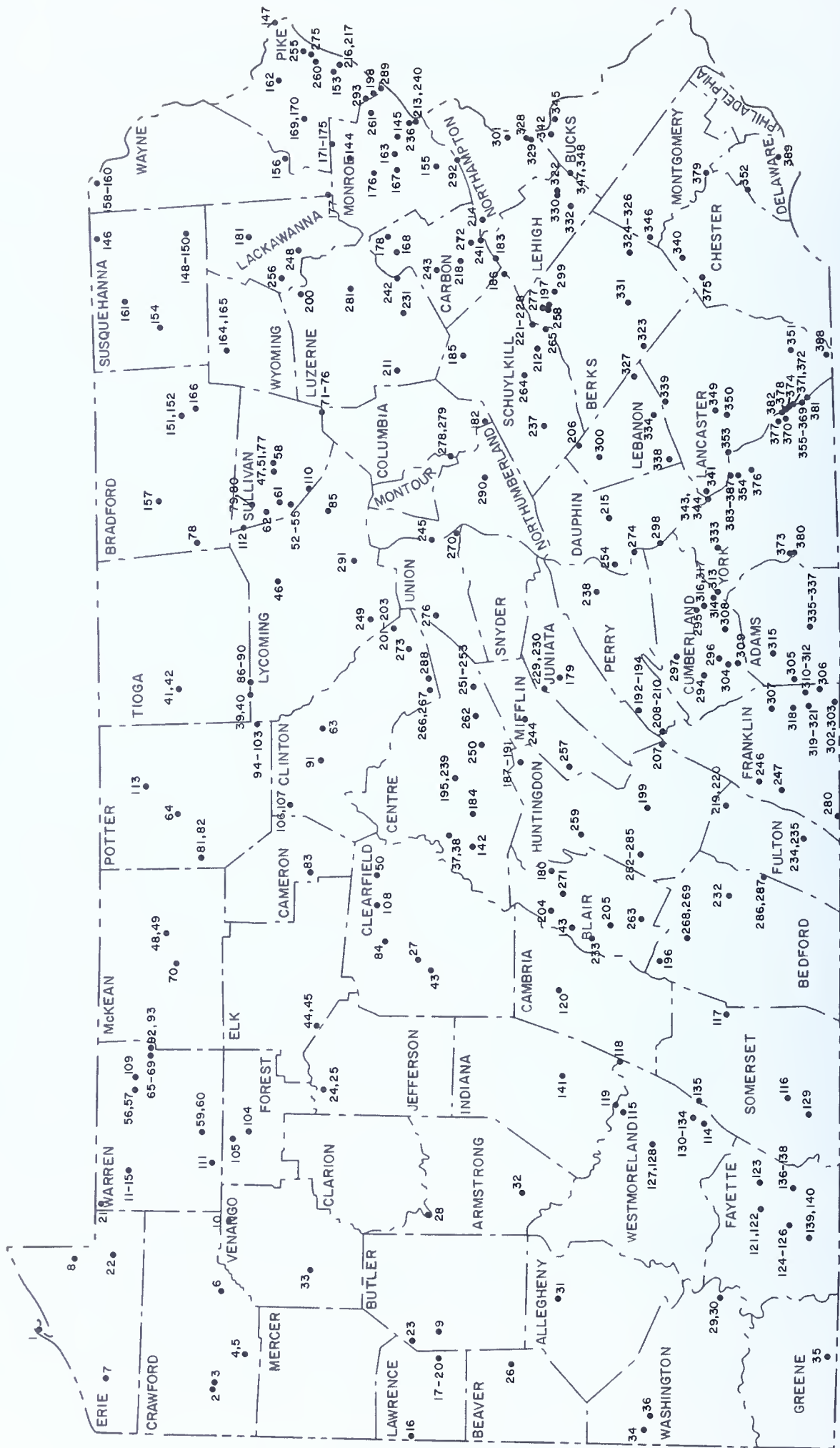
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